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COMPUTERWORLD

the CW guide

A guiding light

Don't miss our revamped products section in this issue. Tailored to the needs of IS professionals, The CW Guide, which begins on page 81, combines user ratings, product reviews, lab results and articles by technology experts. This week's subject is network storage: The CW Guide details what's here, what's not and what's needed to manage all the pieces. Buyers' Scorecard reports how users rate their RAID-equipped LAN servers. Firing Line provides a critique of NCR's 6298 RAID subsystem.

Users question 'fast' Ethernet migration plan

Proposals undercut current standard

By Lynda Radosevich
and Joanie M.Wexler

Users are worried about just how much fiddling it will take to integrate emerging "fast" Ethernet local-area networks with their 10Base-T LANs.

While vendors have implied that moving to 100M bit/sec. Ethernet from today's 10M bit/sec. networks will be straightforward, upgrades may actually entail more equipment and cabling exchanges than users are bargaining for. In particular, a technology proposal on the Ethernet standards committee table from Hewlett-Packard Co. and AT&T describes an entirely new network "posing" as Ethernet, according to observers.

The committee will tackle the user implications of such a network later this month at its meet-

Ethernet, *page 12*

Net kings link up

Novell, AT&T to merge NetWare servers, telephone switches

By Joanie M.Wexler

The tip of a potential network integration iceberg emerged last week in the form of a subtle joint move by the respective leaders of the data and voice networking dominions: Novell, Inc. and AT&T.

The two communications giants said they will team up to merge the capabilities of telephone switches with Novell's NetWare servers, an announcement that was received with only a modicum of enthusiasm by users and industry observers.

However, some observers said they envision the union as a potential turning point in the industry's long-term goal to blend local- and wide-area networks into seamless, enterprise communications highways.

"With the coming of ATM networks, there would be an ability for a telephone switch to become another server on your corporate network," said Bill Conley, manager of information system services at Loral Aerospace Corp. in Newport Beach, Calif.

Asynchronous Transfer Mode is an emerging high-speed switched network that speaks the same protocols as a LAN or a WAN. It is targeted at handling voice, data and video equally well and at someday breaking down the boundaries between LANs and WANs.

Bringing the phone system onto the computer network is "appealing because it integrates everything for me. It consolidates equipment, protocols, databases and management. When you think of the marriage of two companies that could make this happen, Novell and AT&T would be the ones I'd pick," Conley said.

Coming soon

Novell and AT&T said they will ship a NetWare Loadable Module that links NetWare users and AT&T Definity private branch exchanges during the second half of the year. Applications would allow users to combine phone features such as conference calling and voice-mail management with data

Net kings, *page 16*

NETWORLD

For coverage of this biannual networking fair, turn to the following pages:

12 Attachmate gets into E-mail.

14 NetWare gets reinforced links with DEC's Pathworks, IBM mainframes.

15 Banyan delivers next release of Vines, Enterprise Network Services.

16 Lotus displays the remote version of CC:Mail for Macintosh.

Rightsizing

United taps Unix again

By Ellis Booker
SAN FRANCISCO

United Airlines, the No. 2 U.S. carrier, next month will bet for the second time on the value of Unix and client/server computing in a mission-critical application.

The airline, which nine months ago deployed its first large-scale Unix system, is readying a network of 32 IBM RISC System/6000s that will run a relational database management system designed to process data residing on a 20-year-old mainframe-based aircraft maintenance system.

Deployment comes as United, like its airline industry brethren, undertakes a series of severe cost-cutting measures, including

United, *page 8*

Ruling forces government to save electronic messages

By Mitch Betts
WASHINGTON, D.C.

The ghosts of the Watergate and Iran-Contra scandals returned last week when a federal judge prohibited the White House from purging computer backup tapes that hold electronic-mail messages from the Reagan and Bush administrations.

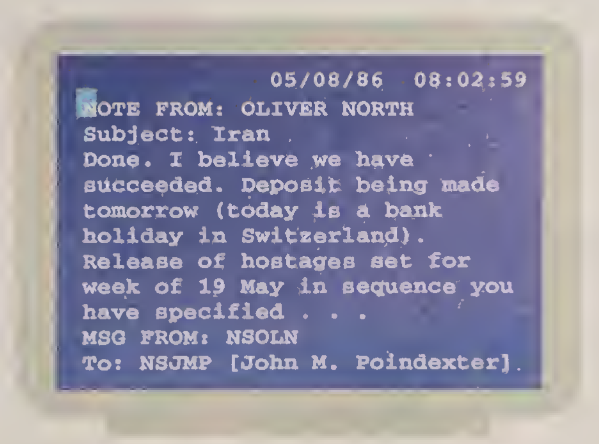
At least some of the E-mail messages — which proved invaluable in the 1987 investigation of the Iran-Contra scandal — are historically significant federal records that should be retained, according to U.S. District Judge Charles R. Richey. He said the E-mail answers the question immortalized in the Watergate hearings: "What did he know, and when did he know it?"

U.S. Sen. John Glenn (D-Ohio) said he was pleased "the electronic shredders have been stopped. To destroy this information would have meant destroying history."

"In a single step, Judge Richey has ordered that 12 years of the real history of the Reagan/Bush era cannot be destroyed and has brought the federal government into the 20th century by recognizing that information in electronic form is every bit as official as information on paper," said Scott Armstrong, a journalist and plaintiff in the suit.

However, one source familiar with White House operations called the ruling "frightening" because of the high costs of storing large volumes of backup tapes. This source also predicted that White House staff members will simply stop using E-mail because of the likelihood that their messages will be disclosed to the press, critics and prosecutors under the

Ruling, *page 8*



```
                    05/08/86  08:02:59
NOTE FROM: OLIVER NORTH
Subject: Iran
Done. I believe we have
succeeded. Deposit being made
tomorrow (today is a bank
holiday in Switzerland).
Release of hostages set for
week of 19 May in sequence you
have specified . . .
MSG FROM: NSOLN
To: NSJMP [John M. Poindexter].
```

Source: Congressional Report

Newspaper

Maj. Hal Ellis designed a customer support system that made users' needs a top priority. Page 75

In this issue

NEWS

Executive shuffling continues at DEC, where Jack Smith, once considered the most likely successor to Ken Olsen, retires unexpectedly. Meanwhile, Microsoft lures a top Apple executive to run its database operation. *Page 4*

Networld '93: Microsoft is expected to reveal plans to add TCP/IP and IBM mainframe communications support to Windows for Workgroups in announcements this week. DEC will preview new members of its Pathworks client/server family, and Novell is updating its communication server to improve remote communications today between NetWare-based LANs and the asynchronous world. *Pages 12-16*

Novell's proposed acquisition of the Unix System V operating system bodes well for users who need smoother integration between Unix-based servers and PC LANs. *Page 47*

The office of the future will feature high-speed networks, multimedia, lightweight portable computers and intelligent "agent" software to cope with an overabundance of digital information, according to information technology professionals looking ahead to the year 2001. *Page 28*

COMMENTARY

Lack of product information isn't a problem for most IS managers. What is needed are facts on how products work with one another. Columnist Elaine Bond says vendors can provide the interoperability information users need — there may even be some profit in it. *Page 33*

THE CW GUIDE: NETWORK STORAGE MANAGEMENT

You probably can't build the "perfect" network storage management system today. But you can piece together one that is "effective" — after a lot of integration and political maneuvering. *Page 81*

Technical Sections

Application Development 69
Desktop Computing 39
Enterprise Networking 51
Large Systems..............................63
Workgroup Computing.................47

Departments

Advanced Technology 28
Calendar 79
Company Index 107
Computer Careers 93
Computer Industry......................109
Editorial/Viewpoint 32, 33
Friday Stock Ticker 108
In Depth 91
Management.....................................75
Marketplace 102

A PUBLICATION OF IDG

AD/Cycle

Bachman spurns IBM

By Kim S. Nash
BURLINGTON, MASS.

Bachman Information Systems, Inc. quit IBM's AD/Cycle alliance last week, citing pressure from IBM to cater to IBM products. IBM countered that Bachman, which has long focused on mainframe DB2 shops, was unwilling to commit to AD/Cycle's recently restated client/server direction.

Bachman also withdrew from its partnerships with IBM for SystemView and Information Warehouse.

IBM's AD/Cycle-related actions during the past year — one in which Bachman's financial situation became increasingly turbulent — were "damaging to Bachman," according to Ed Aely, analyst at International Data Corp. Figures for fiscal first-quarter 1993 showed that sales slipped 12% compared with 1992, from $9.2 million to $8.1 million. Bachman posted a $3.6 million loss for the quarter and plans to lay off 15% of its 340-member staff.

In August, IBM agreed to buy $25 million worth of tools from KnowledgeWare, Inc., a Bachman rival and AD/Cycle partner. IBM also named Atlanta-based KnowledgeWare the vendor of choice for front-end application development tasks such as software analysis and design.

Bachman is the second partner to exit AD/Cycle recently. Intersolv, Inc. pulled out five months ago, citing the "enormous" expense of AD/Cycle, which requires member companies to split profits with IBM on all products sold under the banner [CW, Aug. 31].

Bachman withdrew from the alliance for technological reasons, Bachman Chairman Charles Bachman said. "We need to take AD/Cycle, which is basically for IBM platforms, and extend it to other databases," he said.

Analysts have called Bachman's Model Driven Development product line, introduced in early 1992, a good start, saying that the object-oriented approach to re-engineering and software reuse is on target but that Bachman needs to address client/server development more fully. The company wants to amend that strategy to encompass platforms other than IBM's DB2 and IDMS and announced products for Sybase, Inc. in November.

By leaving AD/Cycle, "we won't have IBM complaining about our supporting Sybase" or other database vendors, Bachman said.

"IBM does not complain," said Mark Elliott, assistant general manager/marketing at IBM's Programming Systems line of business. "We understand that most customers have multiple vendors' products and have announced application development products to support non-IBM platforms," he said, referring to compilers and testing tools announced last summer for Sun Microsystems, Inc. workstations.

Today's AD/Cycle no longer resembles the Utopian development framework IBM laid out three years ago. Frustratingly late and technologically less-than-promised, the AD/Cycle products IBM managed to deliver were not well-received. Few large shops have embraced the framework wholeheartedly, "mainly because there's little product there," Aely said.

The AD/Cycle focus has been redirected to local-area network-based development, primarily at IBM's Toronto facility, in an effort to stay current with demand for Unix workstations and servers, which are being used in many cases to replace IBM's bread and butter mainframes. However, progress has been slow, with a repository that lets these tools communicate on an advanced level not expected until 1995 or later, according to some observers.

Elliott said that a repository that allows data integration will not appear until 1994, which is "slightly later than anticipated" when AD/Cycle was formed.

IBM retains a 10% equity stake in Bachman and a seat on the firm's eight-member board.

Late Breaking News Briefs

ISSC changes seen

IBM this week is expected to raise the stature of its Integrated Systems Solutions Corp. (ISSC) by shifting vertical market staff members into the outsourcing subsidiary and fortifying management.

The company is expected to promote President Denny Welsh to the newly minted position of chairman and chief executive officer, while naming Sam Palmisano, currently general manager in IBM's Asia/Pacific organization, as ISSC president, a source said.

An IBM spokesman declined comment on any of the moves.

It is not clear how many industry-specific marketers will make the move from IBM's national vertical markets group into ISSC. One source said ISSC will also pick up responsibility for international deals.

The moves are part of an effort to give ISSC a more prominent role at IBM as Big Blue implements a services-driven strategy to offset declining product revenue that has led to losses and layoffs.

The changes would establish ISSC as a more bona fide subsidiary, and some industry observers said they believe they set the stage for an ISSC public stock offering.

Chase plan proceeds

The Chase Manhattan Bank NA late last week confirmed that it is going ahead with a project to develop a common computing environment for its 350 regional retail branches in metropolitan New York and Maryland [CW, Oct. 26, 1992]. The project includes a four-year contract with ISSC to provide up to 4,000 IBM Personal System/2s, OS/2 2.0 LAN software and Hogan Systems, Inc.'s banking applications. Chase would not discuss the cost of the project, but sources close to the $97 billion bank placed the cost of the multiyear deal at roughly $85 million. Sources also projected cost savings in improved efficiencies, software maintenance and retail staff cuts.

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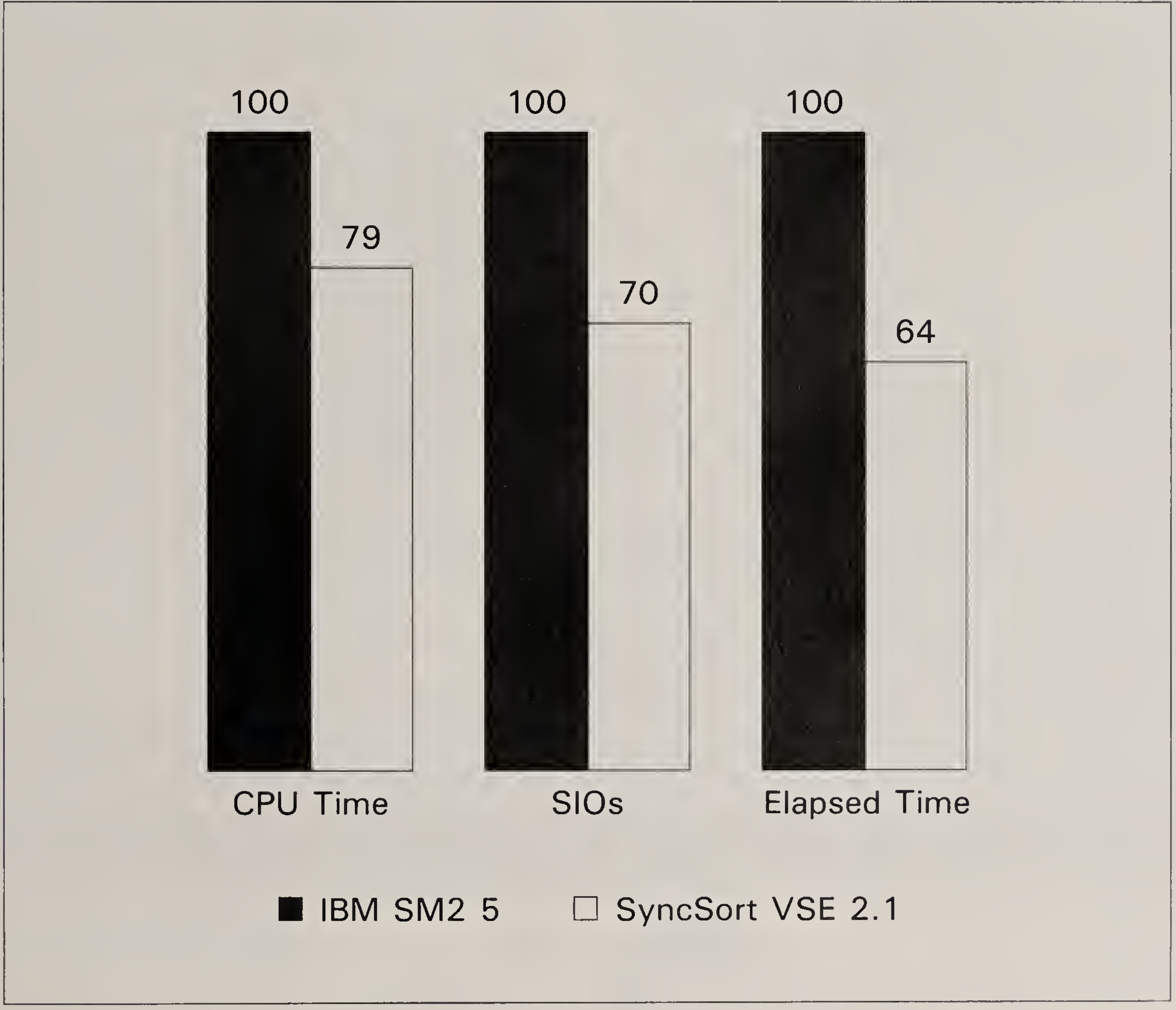

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Financial forecast

DEC losses narrowing

By Melinda-Carol Ballou

MAYNARD, MASS.

Digital Equipment Corp. will kick off 1993 on a less dismal note. Already midway through its fiscal year, the company will announce a quarterly loss this week, but one that analysts expect to be less than half of the previous quarter's and somewhat less than the loss for the comparable period last year.

Losses are expected to range from roughly 85 cents to 95 cents per share, or about $120 million, vs. losses of $2.04 per share, or $260 million, during the previous quarter and $1.25 per share a year ago.

BILL O'CONNELL

DEC's Jack Smith, *senior VP of operations, retires voluntarily after a 38-year career at DEC*

Analysts attributed the modest improvement in DEC's situation to cuts in costs and expenses because of head count reductions, stabilization of VAX sales and a traditionally strong quarter last month.

"I think they're reducing their costs more aggressively than people were expecting," said John Jones, a senior analyst at Salomon Brothers, Inc. in San Francisco.

DEC moved from an employee count of 108,500 on Oct. 1 to a current total of about 100,000, according to Jack Smith, the senior vice president of operations, who announced his retirement from the company last week. He added that DEC is likely to downsize even further — to between 85,000 and 90,000 employees — by the end of the fiscal year in July.

At one time considered a possible successor to DEC Chairman Kenneth H. Olsen, Smith said he is ready to retire after 38 years at the company. His position will not be filled, the company said.

"I feel very confident in what has been achieved over the last few quarters, though I cannot go into specifics because of the quiet period, and that the company is well-positioned for the future," he said.

Not overly optimistic

Despite the modest decrease in losses, analysts were less sanguine in their assessment of DEC's financial position.

"DEC's primary issue is the transition to Alpha, and two [related concerns] will tend to depress revenues and margins," said Bob Herwick, a managing director at Hambrecht & Quist, Inc., a San Francisco-based investment firm. Users are waiting to make the move to Alpha, and DEC's offering discounts as an incentive, he said. "Another big variable is how badly DEC has been affected by the slowdown in Europe."

Revenue from DEC's Alpha AXP line is not expected to kick in until the next fiscal year, analysts said. Two more quarters of losses are likely before DEC moves out of the red, according to Jones.

Apple exec jumps to Microsoft

Competitor gains insider's view of Macintosh system strategies

By James Daly

A funny thing happened on the way to last week's Macworld Expo. Roger Heinen, who heads Apple Computer, Inc.'s system software division and was scheduled to address the assembled Expo masses on the future of Macintosh system software, resigned suddenly and without explanation. And he joined archrival Microsoft Corp.

Heinen will assume the newly created post of vice president of database and development tools at Microsoft, which is currently involved in a bruising slugfest with Borland International, Inc. and others for the hearts and wallets of Windows database users. Microsoft released its first database ever, which is also the first Windows database, at Comdex.

The departure of someone whom *Macworld* literature described as "an exceptionally knowledgeable insider" worried some Apple employees, who said they fear it could have a demoralizing effect on the co-workers he leaves behind.

Some said they worry about the knowledge of the Macintosh system software strategy that Heinen will bring to Microsoft.

Roger Heinen's *more to Microsoft may demoralize Apple staff*

Apple and Microsoft released only short announcements about the resignation, adding grist to the rumor mill and causing many to speculate on the suddenness of the departure.

While some sources said Apple's top managers had been somewhat critical of Heinen's performance, others noted that the move is more likely to indicate how much help Microsoft needs in getting its database market off the ground.

"Microsoft is admitting that their database strategy is not nearly as far along as they had hoped and that they needed a world-class software manager with vision to come in and shake things up," said Peter Kastner, a vice president at the Aberdeen Group in Boston.

Heinen came to Apple in 1990 after 17 years at Digital Equipment Corp. He quickly became one of Chairman John Sculley's top lieutenants, overseeing the development of System 7.0 operating system software and leading the team that developed QuickTime, a program that allows Macintosh users to work easily with video and sound.

Senior West Coast editor Jean Bozman also contributed to this report.

Apple shows color at Macworld Expo

By James Daly

SAN FRANCISCO

There is nothing like a little splash of color to liven things up. And if last week's Macworld Expo is any indication, it's going to be a very lively year for Apple Computer, Inc.

Despite the sudden departure of Senior Vice President Roger Heinen (see story at left), Apple made its long-anticipated move into color publishing with a palette that includes its first color scanner, a color ink-jet printer and a color management system called ColorSync, as well as three other gray-scale printers (see chart below).

The color introductions are the opening notes in what is expected to be a symphony of color products from Apple this year. At next month's Macworld Expo in Japan, for instance, analysts say Apple will introduce its first color portable, the PowerBook 165C. February is also expected to see the rollout of a color version of its entry-level Macintosh Classic that will be priced at roughly $1,400.

MACWORLD EXPOSITION®

The jump into color is seen as long overdue. "Apple really needs to play catch-up in the color arena," said Pieter Hartsook, editor of "The Hartsook Letter" in Alameda, Calif. If successful, Apple could also benefit handsomely.

International Data Corp., a research firm in Framingham, Mass., predicted that in 1993 the notebook market will grow 17%, and color notebooks should increase to 15% of the market, from approximately 8% in 1992 (see story page 10).

It is an opportunity Apple does not plan to miss. "In the coming year, you're going to see color everywhere," said Ian Diery, Apple's executive vice president of worldwide sales and marketing. "In the next few years, we're going to pour enormous energies into cross-platform imaging solutions," he said.

At the core of Apple's strategy will be ColorSync, a color callibration system designed to ensure accurate, device-independent color reproduction among all components in a Macintosh publishing system.

Many companies had already jumped on the ColorSync bandwagon at the four-day show. Among the firms displaying ColorSync-aware products were Eastman Kodak Co., software manufacturer Savitar, Inc., Radius, Inc., printer maker Tektronix, Inc. and Light Source, Inc.

Getting colorful

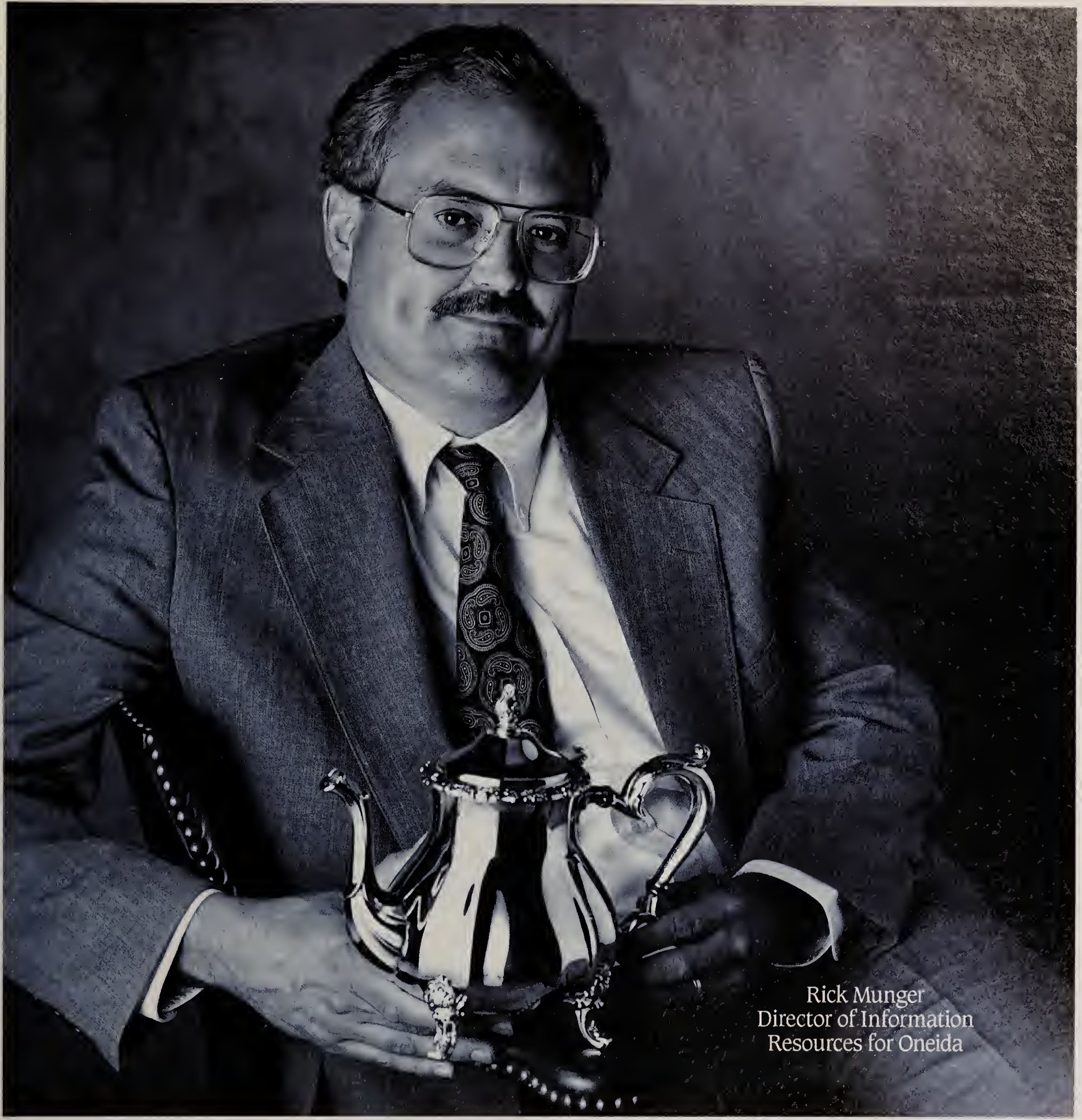
A kaleidoscope of MacIntosh-related products are on the way

PRODUCT	DESCRIPTION	RETAIL PRICE
Color OneScanner	300-DPI flatbed device; available in February	$1,349
Apple Color Printer	300-DPI, large format printer	$2,349
ColorSync	QuickDraw extension for color calibration	**NA
*PowerBook 165C	33-MHz system with 9-in. passive-matrix display; expected in February	Expected to start around $3,500
*Color Classic	16-MHz color version of Classic; expected in February	About $1,500
StyleWriter II	360-DPI inkjet entry-level machine	$359
LaserWriter Pro 600	300-DPI resolution	$2,099
LaserWriter Pro 630	600-DPI resolution	$2,529

*To be announced ** Not available

Source: *Computerworld*

CW Chart: Stephanie Faucher


Rick Munger
Director of Information
Resources for Oneida

"When we decided to downsize, I was pleasantly surprised to see that CA's a leading AS/400 software vendor. The fact that they offer the leading AS/400 manufacturing and warehouse software made it much easier for us. It's always better to go with somebody you already know and trust."

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News Shorts

IBM slims down

IBM last week kicked off the first stage of a plan announced last month to reduce its worldwide work force by 25,000 in 1993. Specifically, IBM's chip making Technology Products and host-oriented Enterprise Systems businesses announced a series of "voluntary incentive" programs designed to reduce their work forces by 3,000 to 3,500 during the next several months. Enterprise Systems is expected to contribute 600 to 800 of that number. Employees will have until March 31 to sign up. Participation is at the discretion of managers, who may reject applicants with "essential skills." Both units are also considering OEM opportunities.

Frame relay due for tests

The **National Institute of Standards and Technology** will conduct a multivendor trial and interoperability demonstration of networks based on Open Systems Interconnect (OSI) and frame relay. Frame relay-based wide-area links will be used to interconnect Ethernet and Token Ring local-area networks running higher level OSI protocols such as the X.400 electronic-mail standard. The purpose is to demonstrate how frame relay can be integrated into existing OSI networks with an eye to making it part of the emerging Industry/Government Open Systems Specification. Thirteen companies will participate.

Group to tout NetWare messaging

After a year of listening to **Lotus Development Corp.** and **Microsoft Corp.** spar about their proposed E-mail standards, 26 vendors of E-mail-based products are joining forces with **Novell, Inc.** this week to remind customers that Novell's NetWare Global Message Handling System (MHS) — formerly NetWare Global Messaging — is a seasoned pro in the E-mail world. The MHS Alliance will demonstrate its products' interoperability at Networld '93 this week.

Court kills LCD tariff

A federal appeals court handed U.S. computer companies an interim victory by ruling that the U.S. International Trade Commission (ITC) erred last year in imposing a 63% tariff on the import of Japanese-made active-matrix LCDs. **Apple Computer, Inc.**, **IBM** and **Compaq Computer Corp.** appealed the ITC ruling, which must now be reconsidered. The ITC action was much criticized because it caused U.S. PC makers to move production offshore to escape the duties.

Banyan/Microsoft deal

Banyan Systems, Inc. and **Microsoft Corp.** announced Banyan support for Microsoft's Windows for Workgroups desktop operating system. The new driver, available from both Banyan and Microsoft, allows Windows for Workgroups users to access their Vines network by pointing and clicking on an icon. Banyan also announced a new Value Investment Protection plan for users of its Vines, Vines for Unix and Enterprise Network Services for NetWare products. Customers who buy the protection receive free releases of the product for 12 months.

SHORT TAKES **Unisys Corp.** has named Craig J. Mento vice president of its newly formed Communications Systems Division of Unisys' U.S. Information Systems (USIS). He will report to William B. Patton Jr., senior vice president and president of USIS. . . . **NCR Corp.** has entered into an alliance with **CKI, Inc.**, an Arlington, Va., software developer, to market an image-based system designed to speed the processing of credit card chargebacks.

News shorts, *page 16*

Client/server cures AMA's computing ills

By Maryfran Johnson
CHICAGO

The American Medical Association (AMA) is giving a high-tech twist to the old admonition "physician, heal thyself," as the 147-year-old organization reaches the midpoint of a massive conversion from proprietary systems to open client/server computing.

Another goal for '93 is to harness an expanding network of about 1,000 PCs and Macintoshes onto Novell LANs. Only half of the machines are now networked.

"All the battles aren't won yet, and probably some of them haven't even been fought," said Chief Information Officer Bob Musacchio. "The whole goal of this is to allow our people to get their own data, to give them access to it."

The diagnosis may be straightforward enough, but the treatment stirred up challenges beyond the technical ones, he noted. During the past two years, Musacchio found himself working just as hard at uniting a "highly fractionalized" user community and information systems staff at as consolidating several small data centers.

At a glance

The American Medical Association:
Founded in 1847, the AMA is a voluntary service organization of more than 290,000 physicians. The AMA acts as a kind of census bureau and repository of information on every licensed U.S. physician, living or dead. The organization also participates in national health policy-making and medical education. It has access to worldwide medical and scientific information through more than 150 computer databases.

"The main way we've done this is by getting the users to sit at the table with IS," he explained. "We interview the users, get their views on application packages and then look it over from the IS point of view. We also put system and programming people into the users' area — outsourcing them, in a sense."

As the world's largest publisher of medical and scientific information, the AMA is more than a professional trade association for doctors.

"The AMA resembles an industrial conglomerate," said John Demetra, a principal at the management consulting firm Deloitte & Touche in Chicago, which is helping the AMA draft its first strategic IS plan. "It's really a professional association, a publishing company and a retailer all in one. The organization runs on information on virtually every front."

Among the AMA's major lines of business is a $60 million publishing operation that includes the monthly *Journal of the American Medical Association* and the weekly *American Medical News*.

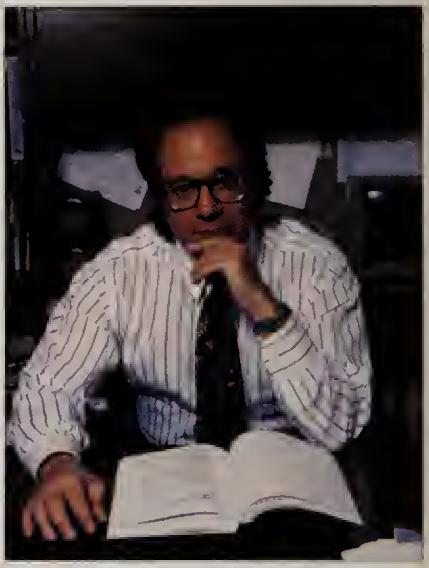
The not-for-profit organization's budget was $187 million last year, with $22 million earmarked for an IS operation serving 1,100 users. Last year, Musacchio spent $1.3 million adding and upgrading personal computers throughout the organization and this year has $3.3 million allocated for capital expenditures associated with the client/server conversion.

Now at the halfway mark of the two-year migration effort, the AMA is writing a strategic IS plan. "The whole impetus behind the plan is to increase the value added to our membership, expand our revenue base and, basically, to help manage expenditures through better data processing and cutting administrative costs," Musacchio said.

James Rappel, the AMA's senior vice president for administration, said developing such a plan is as important "in convincing us that we're spending the right amount" as it is in trimming costs.

Out with the old

Heading out the AMA door in 1993 is all equipment from Wang Laboratories, Inc. as well as Atex, Inc.'s publishing software system. The AMA is replacing the Atex system with Xyvision, Inc.'s publishing software running on a Digital Equipment Corp. Unix-based server. Six IBM RISC System/6000 servers are used for other publishing and marketing applications.



CIO Bob Musacchio *and the AMA are at the halfway mark of a two-year open systems migration*

Another goal for '93 is to harness an expanding network of approximately 1,000 IBM PCs and Apple Computer, Inc. Macintoshes onto Novell, Inc. local-area networks. Only about half of the machines are networked now, Musacchio said.

The linchpin of Musacchio's strategy, however, is the installation of a Unix-based Sequent Computer Systems, Inc. multiprocessor as a file and database server. It will act as a pivotal stepping-stone between a pair of IBM 3090 400E mainframes, the Novell PC LANs and several IBM Personal System/2 and Netframe Systems, Inc. servers.

Doctors' records

In its role as a record-keeping organization for every licensed physician in the U.S. since the mid-1800s, the AMA has nurtured a master database file that now includes more than 600,000 practitioners. That file gobbles up nearly 1 million megabytes of disk drive space on the IBM mainframes.

Finding new ways to slice and dice that master file — by far the largest of the AMA's 300 in-house databases — prompted the purchase of the Sequent multiprocessor and the addition of IBM's DB2 relational database management system to the mainframe's old IMS database system.

Rather than rewriting old applications, the IS staff will pull data out of IMS or DB2 and work with it under a Sybase, Inc. RDBMS on the Sequent.

"One of our driving forces is to stay mobile and flexible," Musacchio said. "Our new rule for building application systems is that if it takes more than three months, forget about it."

DISTRIBUTED QUERY COMPARISON

SYBASE

90 LINES OF COMPLEX CODE

```
/* reset the counter for build of third table */
se
wh
be

/*

/*
 c

/*
 c

en

/*
*/
DF
DF
pr
se
wh
be
se
se
EX
@p
@l
up
 s

en

/*
SE
```

```
CREATE PROCEDURE la_qty
/* for use on WESTCOAST server */

/* returns count for one part only */
@partno char(6),
@la_count int output
AS
SELECT @la_count =
(SELECT qty FROM la_parts
WHERE partno = @partno)

DECLARE @cnt int
DECLARE @counter int
DECLARE @la_count int
DECLARE @partno char(6)
SELECT @cnt = COUNT(partno) FROM ny_parts

/* ny_parts is the parts master; need count
for sequential comparison with la_parts
to simulate a distributed join */

SELECT @counter = 0

/* create temporary table for part numbers
and quantities from ny_parts */
CREATE TABLE #allparts1
   (partno char(6) NULL,
   ny_qty int null)

/* create temporary table for row numbers
for sequential call of la stored procedure */
CREATE TABLE #allparts2
   (seq int)

/* create temporary table for
sequential build from first two temp tables */
CREATE TABLE #allparts3
   (partno char(6) NULL,
   ny_qty int null,
   la_qty int null,
   seq int)

/* build sequence numbers for each ny row */
while @counter 1> @cnt
begin
   select @counter = @counter + 1
    insert into # all parts 2 (seq) values ( @ counter )
end

/* populate temp table with ny parts and quantities */
insert into #allparts1 (partno, ny_qty)
select ny_parts.partno, ny_parts.qty from ny_parts
```

*Program code independently written and tested.

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```
SELECT NY_QTY, LA_QTY
FROM NY_PARTS, LA_PARTS
WHERE NY_PARTNO = LA_PARTNO;
```

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United taps Unix again

CONTINUED FROM PAGE 1

layoffs, salary cuts and flight reductions, designed to reduce operating expenses by $400 million a year.

The No. 2 carrier's financial woes did not drive this particular Unix project, stressed United officials connected to the project. But United clearly has an incentive to use lower cost computing architectures as a way to reduce its overall expenses, analysts said.

"Our move to open systems is driven by a lot of pressures, both technical and economic," said Don Karmazin, vice president of MIS at United. He said the effort minimizing the growth of mainframes and maximizing the use of client/server technology existed before last week's announced expense cuts and would not be accelerated.

Regarding those cuts, Karmazin could not say how the job reductions and expense reduction goals would impact his information systems organization or its projects.

United's second major Unix client/server initiative is targeted at a labor- and resource-intensive function: aircraft maintenance. The company hopes the lower cost Unix system will save time and money and create new maintenance efficiencies. In fact, the project is expected to pay for itself in a year.

United's System Aircraft Maintenance Control (SAMC) department — located at San Francisco International Airport — operates on a 24-hour, 7-day schedule. Its 100 operators are responsible for advising pilots and line mechanics about the repair history of each of the 536 planes in the United fleet.

The current Unisys Corp. mainframe application required dozens of keystrokes to accomplish the most routine inquiries, according to Ted James, a senior maintenance controller at United's SAMC department. "All the data elements are on the host; the problem has been mixing, matching and presenting them," James said.

The networked workstations, for example, will reduce the number of keystrokes needed to perform a task from 37 to four, James pointed out.

Meanwhile, the new architecture means connectivity to other hosts and applications that was not possible before. For instance, newer United aircraft transmit engine statistics 20 seconds after the nose gear leaves the runway. But this data is stored on an IBM 3090 mainframe complex in Chicago. SAMC operators will now be able to review and compare these records quickly in one of the 20 or so Open Software Foundation Motif windows that will be active on their two 19-in. color monitors.

United's Unix application goes beyond creating a pleasing graphical interface into mainframes. "Straight terminal emulation would not have given us what we required," said James, who noted that gathering "little pieces of information by hand" is not an ideal tool for troubleshooting a commercial jetliner.

Thus, a key part of the application is an RDBMS from Sybase, Inc. that processes data locally on two RS/6000s. These servers will automate what were once labor-intensive duties, such as tracking a daily report on delays and maintenance problems.

Another innovation is the integration between the RS/6000s and AT&T's newest Definity Generic 3R phone switch, a combination that manages calls from technicians and pilots in the air more intelligently (see story below).

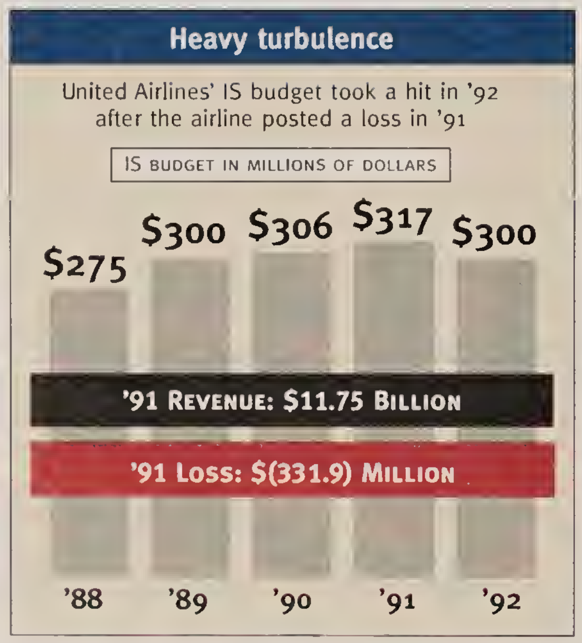
If James is pleased with the functional benefits of the new system, members of United's IS department are likewise happy the project did not involve a programming effort on the mainframe.

"We avoided interruptions to these users," said Sandy Kingery, project manager at United.

But some observers said the United project should not be heralded as a victory for Unix.

"Putting a front end on a mainframe is as old as mainframes themselves," said Omri Serlin, president of ITOM International Co., a consultancy in Los Altos, Calif. "The fact that these [systems] happen to run Unix is not terribly significant," he said, arguing that the watershed will come when United or another airline decides to decentralize its reservation system.

Yet even with one project under way and another due to start, United remains coy about how far it intends to fly with open systems and Unix. Its first Unix project consists of a network of Silicon Graphics, Inc. Unix workstations and IBM RS/6000 servers at its Chicago headquarters, which took over scheduling United's flight crews.



Heavy turbulence

United Airlines' IS budget took a hit in '92 after the airline posted a loss in '91

Source: *CW Premier 100*

CW Chart: Tom Monahan

Integrated phone/IS system rings true for United

A tightly integrated computer and phone system was one of the key reasons United Airlines elected to install some 32 IBM RS/6000s in its SAMC department.

Fielding telephone calls occupies most of SAMC operators' time. Each receives an average of 40 calls per hour from technicians in hangars or pilots in the air.

Using an industry standard called Adjunct Switch Application Interface, the RS/6000s link for the first time with and control an AT&T Definity Generic 3R phone switch over an Integrated Services Digital Network Basic Rate Interface.

Incoming calls, based on a two-digit code, can be routed to the proper operators, who see the calls and their origin on their screens. The operators can also redirect calls much more easily than before and review, in real time, phone logs stored in a Sybase RDBMS.

In fact, IBM adjusted to United's open systems demands when it came to integrating the phone system with the RS/6000s. IBM's usual solution for intelligent host-to-switch applications is CallPath, which today supports only OS/2 or Application System/400 servers.

—*Ellis Booker*

Saving electronic messages

CONTINUED FROM PAGE 1

Freedom of Information Act.

The ruling applies only to the White House, but experts in the field of records management said it also raises the question of how much E-mail should be saved in the private sector.

Most companies simply let users save or delete E-mail at their own whim, but they should have a formal policy for distinguishing between "the garbage and the good stuff," according to Michael F. O'Shea, president of Arenburg Consultants in Toronto.

"Contracts, reports and speeches get printed out, but the [interim] messages that would help you trace the reasoning behind the documents are lost because the electronic mail is purged indiscriminately," O'Shea said.

However, the thought of keeping millions of E-mail messages gives most information systems managers a big headache, in part because the majority are of the ephemeral "let's do lunch" variety.

"As an IS manager, I would not want to invest limited resources on E-mail archives for 3,000 users, for very little return," said Richard M. Kesner, chief information officer at Babson College in Wellesley, Mass. However, he added that the court ruling makes sense for government agencies, where accountability and tracing the decision-making process are more important.

Mark Langemo, professor of information management at the University of North Dakota, said corporate policies governing E-mail and other electronic records should be hammered out by a team that includes the IS manager, the records manager and the legal and finance departments. Then, the rules should be communicated to end users.

However, keeping huge volumes of useless records for too long can also land companies in hot water, Langemo cautioned. Lawyers suing companies in trade secrets and product liability cases are beginning to scour the company's E-mail records in hopes of finding incriminating statements, he said.

Langemo said if a company has a systematic records management program, it can destroy records in the regular course of business without any legal repercussions [CW, March 2].

Like sweeping and dusting

Attorneys for the White House argued that purging the computer tapes is a mere housekeeping chore necessary for a smooth transition to a new administration. They said that any important documents qualifying as "federal records" were printed out on paper, so keeping the electronic backups and minor messages was an unnecessary storage burden.

"The government's position is that you hit the Print button" to create an official record, U.S. Attorney Jason Baron said at a Dec. 21 hearing. Michael E. Tankersley, attorney for the plaintiffs, argued that the electronic versions of documents are not just extra copies, as the government had alleged, but are the ones used in real work. "If anything, the paper copy is the one that is the extra copy," Tankersley said.

The lawsuit to block erasure of the magnetic tapes was filed in 1989 by a group of researchers and historians led by Armstrong. The plaintiffs pointed out that although presidential aide Oliver North had deleted and shredded many embarassing memos related to the Iran-contra scandal, the computer backup tapes provided investigators with a gold mine of information.

In last week's ruling, Judge Richey said some of the information on the tapes meets the definition of a federal record, and the White House policy of erasing all electronic records is arbitrary and capricious. He said the electronic records and logs contain details not on the printout about who received the information and when.

Some of the records will be available under the Freedom of Information Act; the remainder will be available in five or 12 years as presidential records, Richey said.

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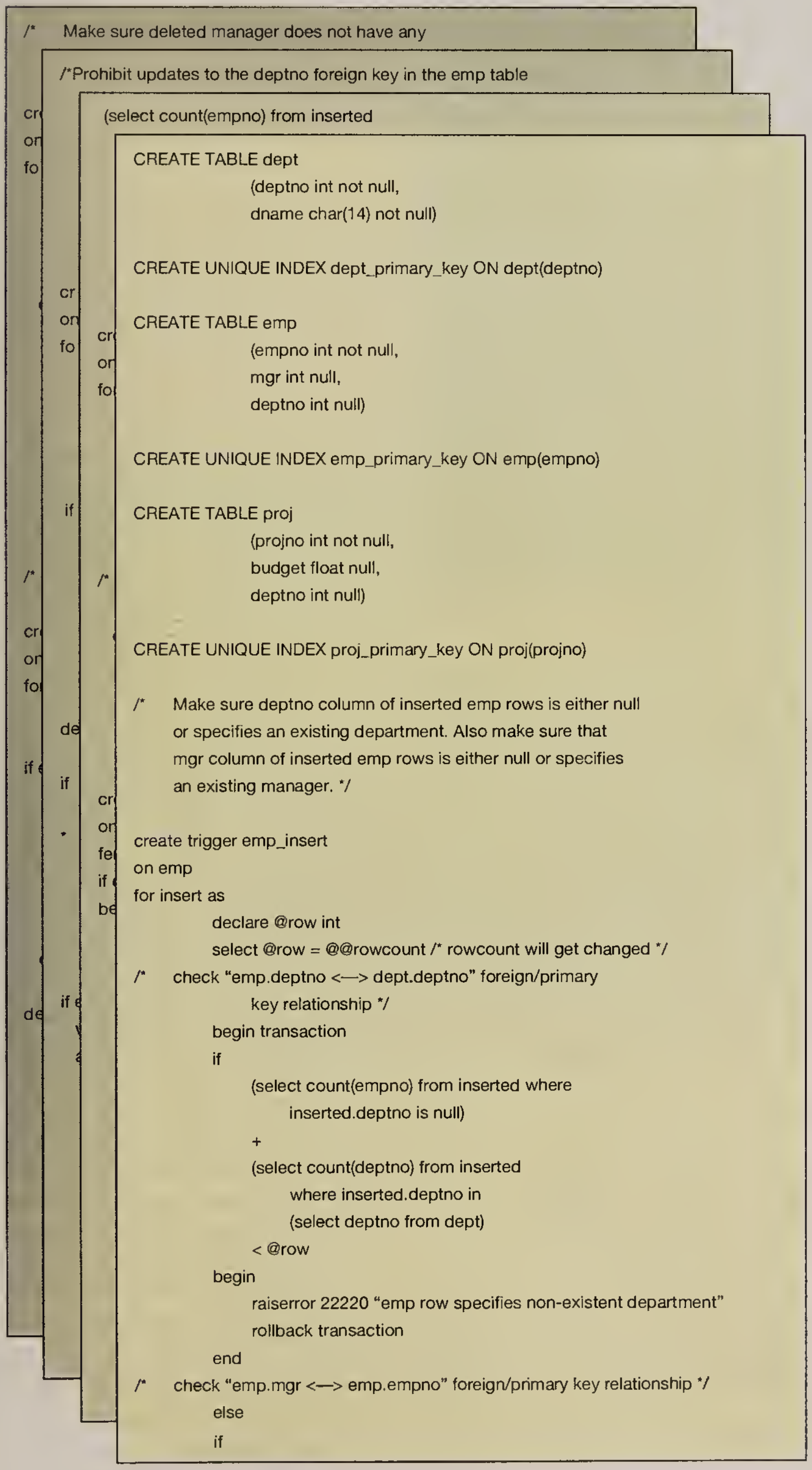

```
/*   Make sure deleted manager does not have any
```

```
/*Prohibit updates to the deptno foreign key in the emp table
```

```
(select count(empno) from inserted
```

```
CREATE TABLE dept
                (deptno int not null,
                dname char(14) not null)

CREATE UNIQUE INDEX dept_primary_key ON dept(deptno)

CREATE TABLE emp
                (empno int not null,
                mgr int null,
                deptno int null)

CREATE UNIQUE INDEX emp_primary_key ON emp(empno)

CREATE TABLE proj
                (projno int not null,
                budget float null,
                deptno int null)

CREATE UNIQUE INDEX proj_primary_key ON proj(projno)

/*   Make sure deptno column of inserted emp rows is either null
     or specifies an existing department. Also make sure that
     mgr column of inserted emp rows is either null or specifies
     an existing manager. */

create trigger emp_insert
on emp
for insert as
          declare @row int
          select @row = @@rowcount /* rowcount will get changed */
/*   check "emp.deptno <—> dept.deptno" foreign/primary
                key relationship */
          begin transaction
          if
                (select count(empno) from inserted where
                     inserted.deptno is null)
                +
                (select count(deptno) from inserted
                     where inserted.deptno in
                     (select deptno from dept)
                < @row
          begin
                raiserror 22220 "emp row specifies non-existent department"
                rollback transaction
          end
/*   check "emp.mgr <—> emp.empno" foreign/primary key relationship */
          else
          if
```

*Program code independently written and tested.

```
CREATE TABLE DEPT
   (DEPTNO NUMBER(2) PRIMARY KEY,
   DNAME CHAR(14) NOT NULL);

CREATE TABLE EMP
   (EMPNO NUMBER(4) PRIMARY KEY,
   MGR NUMBER(4) CONSTRAINT mgr_fkey REFERENCES EMP,
   DEPTNO NUMBER(2) CONSTRAINT dept_fkey REFERENCES
DEPT);

CREATE TABLE PROJ
   (PROJNO NUMBER(4) PRIMARY KEY,
   BUDGET NUMBER(7,2),
   DEPTNO NUMBER(2) CONSTRAINT pdept_fkey REFERENCES
DEPT
      ON DELETE CASCADE);
```

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Notebooks

Color expected to make splash in '93

By Michael Fitzgerald

Color notebooks will bring vendors a lot of green in 1993, according to most vendors and analysts, though high prices may keep some users seeing red.

"1993 will be a very strong year for color notebooks," predicted Bruce Stephen, director of PC hardware and pricing research at International Data Corp. in Framingham, Mass.

Several major notebook vendors contacted suggested that in dollar amount, color notebooks may outsell monochrome notebooks this year.

"I'd say they approached 50% of our revenues in notebooks in '92 and will exceed 50% in '93," said Grant Johnson, director of product marketing at Toshiba America Information Systems, Inc.

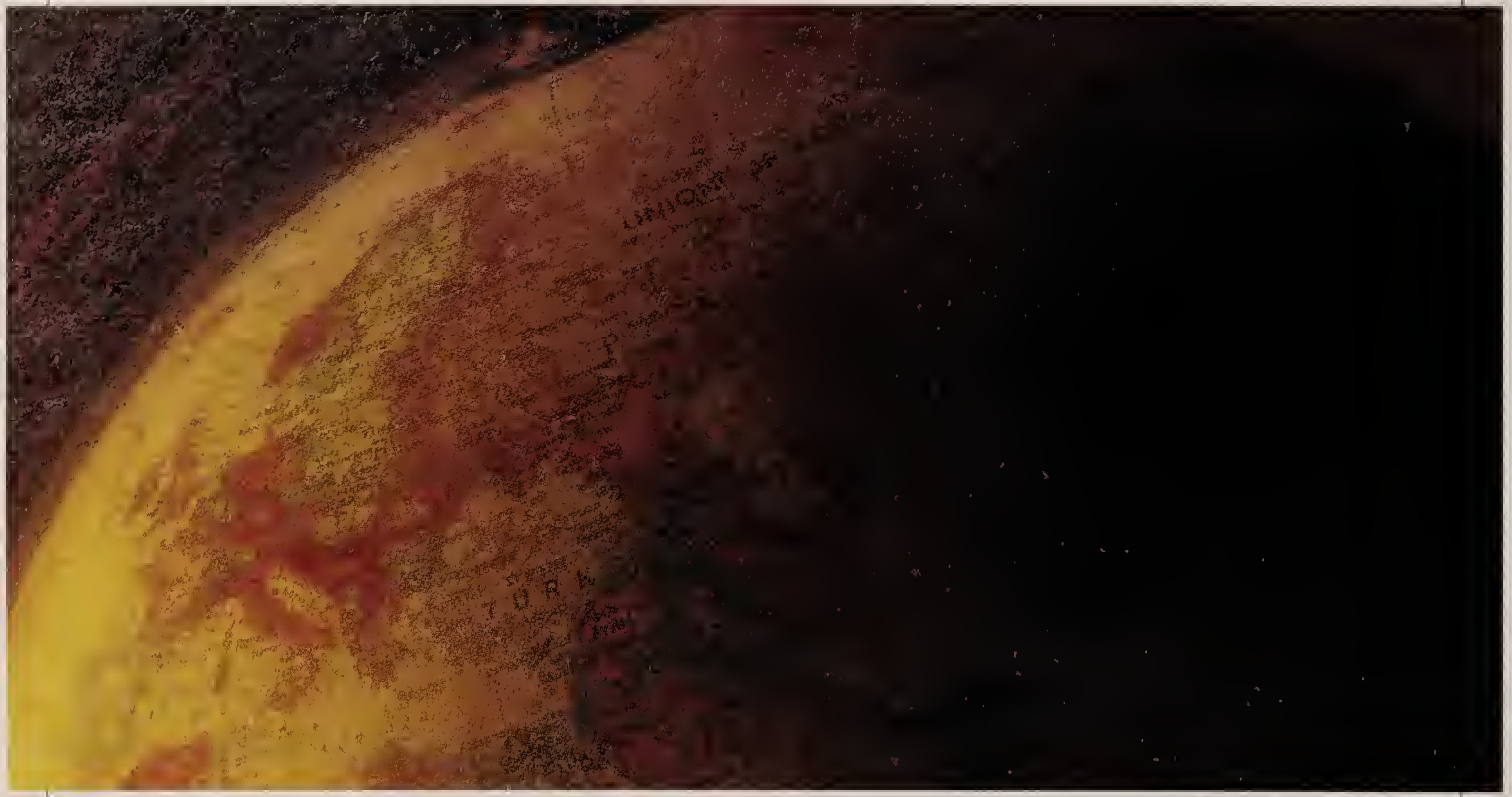
"Dollarwise, we expect our PowerExec Color notebooks to come close to being our No. 1 seller [in 1993]," said Marcy Puhnaty, product marketing manager/worldwide portable systems marketing at AST Research, Inc.

Users contacted said they wanted color notebooks.

"We want color for presentation quality when we go to a client," said Chad Pearce, MIS manager at the Philadelphia office of Godwins, Inc., a benefits consulting firm in Chicago. Pearce said he expects to purchase mostly 486SL-based color notebooks this year.

What keeps many users from opening their wallets is the high cost of color notebooks. For instance, the GM Motor Sports Technology Group in Warren, Mich., recently looked at upgrading the screens on its Zenith Data Systems Z-Notes from monochrome to color but decided against the upgrade.

"The screen performance was very good, but the price/utility trade-off was still not satisfactory to us," said Richard Amacher, MIS director at GM Motor Sports. "It is something we'd like to have, but until they get the cost differential down to, say, under $500, we're willing to take the notebook back to a trailer and plug it into a color monitor."



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Everex files for Chapter 11

By Michael Fitzgerald

FREMONT, CALIF.

The PC price war has claimed its biggest victim to date: Everex Systems, Inc. hastily filed for Chapter 11 protection from its creditors last week, just after Steve Hui, its co-founder and chairman, was forced out.

Sources close to the once-thriving $500 million company said Everex was forced into bankruptcy court after one of several major suppliers to which it owes millions of dollars decided to file suit against it.

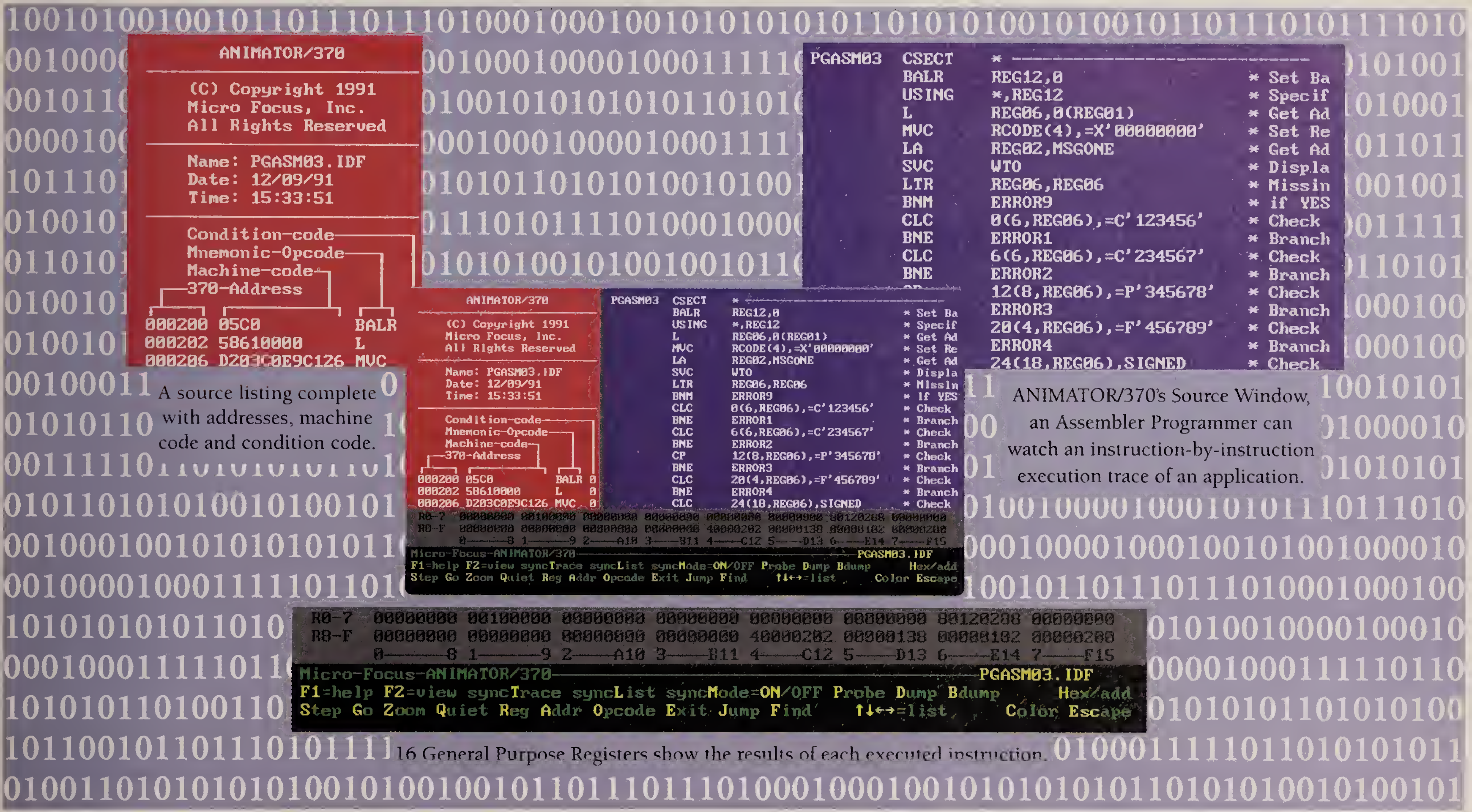
A company spokesman confirmed the report, saying supplier pressure was among the factors that forced the company to seek protection. It is unclear when the court will rule on the case.

Everex may be able to scale down and survive. The company now employs 875, down from 2,100 in December 1991. The company is also trying to sell pieces of itself, such as its low-end desktop line and its scanner and printer groups, the spokesman confirmed.

Some observers said they think a buyer might take all of Everex. It has some major assets, including a large Air Force contract. "They have a big backlog of orders and some very large government contracts," said Samuel Adicoff, president of Edge Information Systems, Inc., a value-added reseller in San Jose, Calif.

Jack Kenney was named Everex's chief executive officer last week, and cofounder John K. Lee became chairman.

You've Never Seen 370 Assembler Programs Like This Before.



```
ANIMATOR/370

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Name: PGASM03.IDF
Date: 12/09/91
Time: 15:33:51

Condition-code
Mnemonic-Opcode
Machine-code
370-Address

000200 05C0          BALR
000202 58610000      L
000206 D203C0E9C126  MVC
```

A source listing complete with addresses, machine code and condition code.

```
PGASM03  CSECT    * ---------------------------------
         BALR     REG12,0                     * Set Ba
         USING    *,REG12                     * Specif
         L        REG06,0(REG01)              * Get Ad
         MVC      RCODE(4),=X'00000000'       * Set Re
         LA       REG02,MSGONE                * Get Ad
         SVC      WTO                         * Displa
         LTR      REG06,REG06                 * Missin
         BNM      ERROR9                      * if YES
         CLC      0(6,REG06),=C'123456'       * Check
         BNE      ERROR1                      * Branch
         CLC      6(6,REG06),=C'234567'       * Check
         BNE      ERROR2                      * Branch
                  12(8,REG06),=P'345678'      * Check
                  ERROR3                      * Branch
                  20(4,REG06),=F'456789'      * Check
                  ERROR4                      * Branch
                  24(18,REG06),SIGNED         * Check
```

ANIMATOR/370's Source Window, an Assembler Programmer can watch an instruction-by-instruction execution trace of an application.

```
R0-7  00000000 00100000 00000000 00000000 00000000 00000000 00120208 00000000
R8-F  00000000 00000000 00000000 00000000 40000202 00000138 00000102 00000200
      0-------8 1-------9 2-----A10 3-----B11 4-----C12 5-----D13 6-----E14 7-----F15
Micro-Focus-ANIMATOR/370---------------------------------------------PGASM03.IDF
F1=help F2=view syncTrace syncList syncMode=ON/OFF Probe Dump Bdump      Hex/add
Step Go Zoom Quiet Reg Addr Opcode Exit Jump Find     ↑↓←→=list      Color Escape
```

16 General Purpose Registers show the results of each executed instruction.

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Micro Focus 370 Assembler with ANIMATOR/370 also offers a Probe facility that allows programmers to quickly dissect a 370 Assembler instruction. All screen dumps can be displayed in one or two windows with new DUMP utilities and a complete list of 370 Assembler instructions (sorted by mnemonic code) is included in ANIMATOR/370's new online reference system. In addition, a built-in hex adder/converter allows for quick calculation of index/base/displacement addresses or adding other hex values.

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GSA Contract Number GS00K90AGS5251-PS02.

Users questioning 'fast' Ethernet migration plan

CONTINUED FROM PAGE 1

ing in Santa Clara, Calif.

The HP/AT&T proposal is "no more Ethernet than a baseball bat is a waffle iron," committee member Joe Skorupa said. "I wouldn't even compare it to apples and oranges because at least they are both fruits" (see chart).

Users wary

New, unfamiliar technology does not sit well with users. "If I have several choices, and one is going to cause me to recreate the wheel and rediscover fire, I'm not too crazy about it," said Ray Parcell, computer operations specialist at Port Hueneme, an engineering agent for surface weapons in Yorktown, Va.

Adding to the skepticism is the fact that users already have options among more mature high-speed technologies such as Fiber Distributed Data Interface (FDDI) and Asynchronous Transfer Mode (ATM).

"If I can replace an Ethernet board with a relatively inexpensive one and use the same cabling, [fast Ethernet] has great possibilities. But if it's more like putting in a whole new network, my gut feeling is that FDDI and ATM hold more promise for the future" because they are inherently more efficient networks, said Edwin Riddle, head of the communications and network systems branch at NASA-Langley Research Center in Hampton, Va.

A "whole new network" is the way committee member Paul Nikolich describes the HP/AT&T technology. "Nothing stays the same; the physical layer, the media access . . . it's all new," he said.

How much of a headache moving to fast Ethernet will be depends on which vendor's technology the committee chooses and what type of cabling users already run. This is because any of the upgraded Ethernets will at least require additional pairs of Category 3 or new, higher grade Category 5 unshielded twisted-pair wiring, unless users are already running high-quality shielded twisted-pair, coaxial cable or fiber.

Whether Category 3 or 5 becomes standard, "there are going to be some users who don't already have the proper cabling," said Jack Moses, vice president of start-up Grand Junction Networks, Inc. in Union City, Calif., developer of a fast Ethernet competing with the HP/AT&T proposal.

Familiarity key

But while Parcell runs compatible, shielded wiring, he said he still would not want his Ethernet staff to have to start over in developing LAN expertise. "I'd consider FDDI first because I'd be looking at something that at least has a familiar shape to it," he said.

Brice Clark, HP's strategic planning manager, countered that the advantage of HP/AT&T's proposal over FDDI — like other fast Ethernets — is that it "retains Ethernet's frame definition, which allows users to easily integrate [to traditional Ethernet networks] through [faster] bridging rather than routing."

In addition to new adapter cards and hub modules, HP/AT&T and other 100M bit/sec. Ethernets will require companies to install new software drivers in their computers and bridges to access 10M bit/sec. Ethernet networks, HP and Grand Junction said.

Fast EtherNOT?

Migration to Hewlett-Packard/AT&T's souped-up "Ethernet" from 10Base-T would require a near-forklift upgrade

10Base-T	HP/AT&T	Grand Junction	MicroAccess
Speed: 10M bit/sec. ●	100M bit/sec. ✷	100M bit/sec. ✷	100M bit/sec. ✷
Access method: CSMA/CD ●	Transmissions prioritized in order of request ✷	CSMA/CD ●	CSMA/CD ●
Cabling: Two pairs Category 3 ●	Four pairs Category 3 or two pairs Category 5 ✷	Two pairs Category 5 ✷	Six pairs Category 3 ✷
Distance: Network diameter: 2,500 meters ●	200 meters for Category 3 or 400 meters for Category 5 ✷	250 meters ✷	100 meters ✷
Topology: Hub-based ●	Hub-based ●	Hub-based ●	Optional hub ◐
Bandwidth rationing: Shared ●	Isochronous ✷	Shared ●	Shared ●
Packet length: Maximum of 1,500 bytes ●	Maximum of 1,500 bytes ●	Maximum of 1,500 bytes ●	4,500 bits ✷

● Existing standard ✷ Departure from standard that requires user network changes

Source: *Computerworld*

CW Chart: Michael Siggins

Vendors spar over fast Ethernet standard

The 100M bit/sec. Ethernet world is splitting into enemy camps: those lining up behind an HP/AT&T technology proposal and those teaming up behind proposals by start-ups Grand Junction Networks and MicroAccess, Inc.

At issue is Ethernet's carrier-sense multiple access with collision detection (CSMA/CD) media access layer, a defining component of the Ethernet standard. The HP/AT&T contingent is proposing a whole new media access layer.

"We consider CSMA/CD as a back-looking approach because it does not have advanced functionality that people may want in a few years," said Brice Clark, a strategic planning manager at HP. In addition, "we're concerned whether CSMA/CD will even operate well" at 100M bit/sec. speeds, he said.

HP proposes an access method that prioritizes transmissions in order of request. This eliminates the need for collision detection, which eats up network bandwidth and could cause problems at higher speeds, Clark said.

"There is no reason to think that the Ethernet protocol cannot be scaled up with respect to speed," said Jack Moses, vice president of Grand Junction. "What matters is how long it takes to standardize a new network. If you preserve the media access layer, you leave a good piece of the Ethernet standard intact, and standardization can happen quickly."

"Clearly, this is all a marketing ploy," said Paul Nikolich, member of the Institute of Electrical and Electronics Engineers 802.3 committee that is reviewing the proposed standards. Neither camp's proposals are truly Ethernet, but "people are jumping on the Ethernet bandwagon" because users are so familiar with Ethernet, he said.

—Lynda Radosevich

Network-to-mainframe connectivity

Attachmate segues in E-mail mart

By Elisabeth Horwitt
BOSTON

■ Attachmate Corp. will attempt to leverage its leadership in microcomputer and local-area network-to-mainframe connectivity as it plunges into the LAN-based electronic-mail market at Networld '93 this week.

Attachmate's Zip:Office, a LAN-based E-mail and scheduling system that is slated to debut at the show, will offer tight integration with IBM host-based E-mail systems, spokesmen for the Bellevue, Wash., vendor said last week.

Zip:Office allows users to exchange mail with IBM's Professional Office System (Profs) and OfficeVision, as well as any host-based E-mail systems supporting IBM Systems Network Architecture Distributed Services, an Attachmate spokesman said. And unlike competing LAN E-mail products, Zip:Office requires no special mainframe software or E-mail gateways to link up with host E-mail, he added.

Even Lotus Development Corp.'s CC:Mail, which IBM is referencing as a LAN-based E-mail system, requires a gateway from a company such as Soft-Switch, Inc., "or at least additional software on the host site," before it can talk to Profs, said Bob Graves, assistant director of university computing at Florida State University in Tallahassee.

The university chose Zip:Office and its E-mail component, Zip:Mail, to support E-mail exchange among a growing installation of Novell, Inc. NetWare LAN users and a large base of Distributed Office Support System and OfficeVision systems, Graves said.

Zip:Mail also supports 3270 links for users who want to access CICS host applications, Graves said.

Multiple host scheduling

In addition, Zip:Office is the only LAN-based office system that can coordinate scheduling with users on multiple hosts and LAN servers using IBM's Cross System Calendar Support utility, the vendor said.

"Calendaring is one of the big bonuses. We hope to have enterprisewide calendaring across our LANs within six months," Graves said.

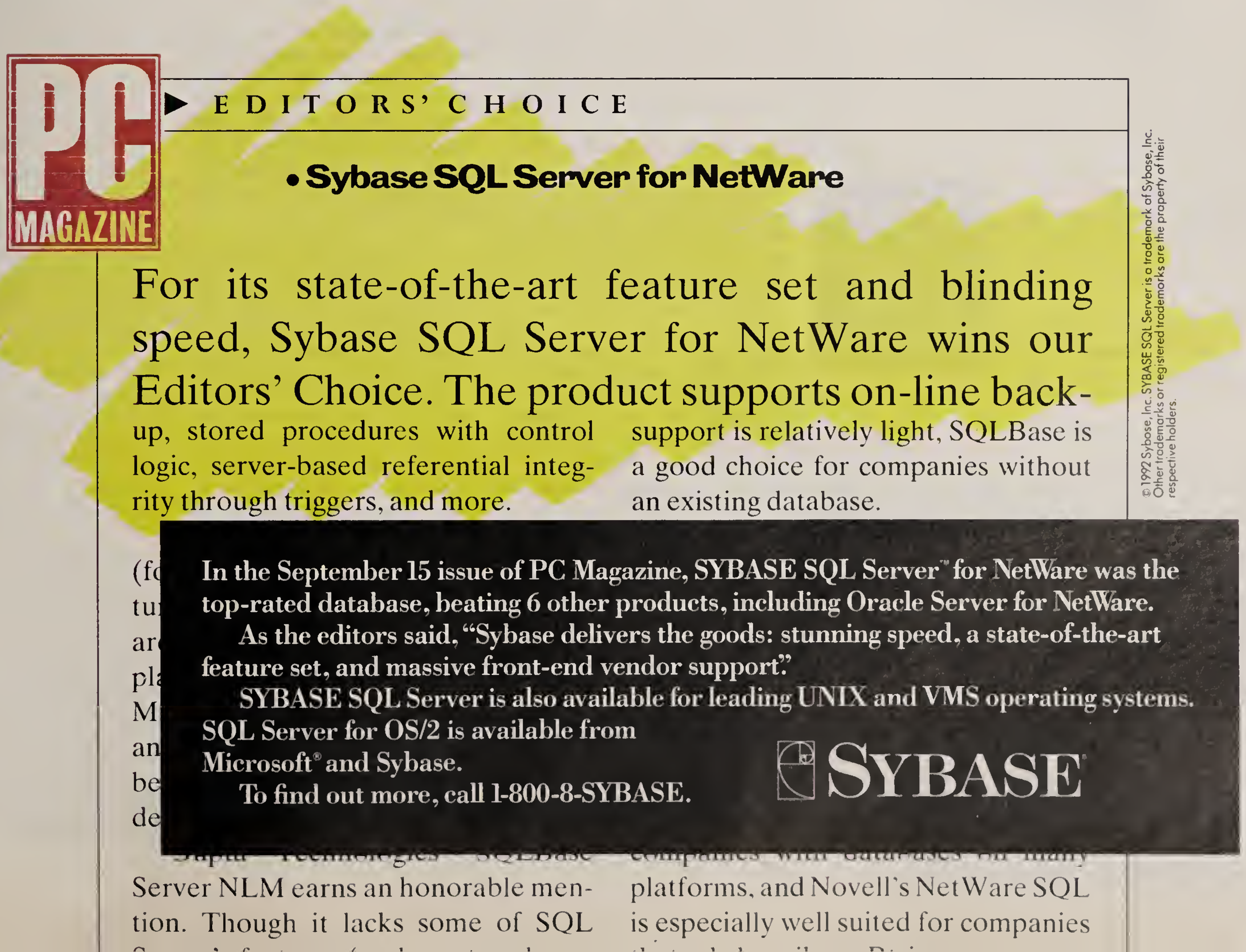
Pricing for Zip:Office depends on configuration, according to Attachmate. Available immediately, the product will support a wide range of E-mail standards, including Novell's Message Handling System, Microsoft Corp.'s Microsoft Application Programming Interface and Vendor Independent Messaging, the company said.

Corrections

•Because of a reporting error, a story in the Dec. 28/Jan. 4 issue incorrectly stated that Bethlehem Steel Corp. will own any upgraded equipment that Electronic Data Systems Corp. may buy to run the steel company's operations. In fact, EDS will own any new equipment, but Bethlehem Steel will continue to own its existing data centers.

•Because of incorrect information supplied by the company, an item in the Dec. 21 issue incorrectly reported Reseller Software Spectrum, Inc.'s fiscal 1992 financial revenue. The company earned revenue of $159 million in fiscal 1992.

The Editors were unbiased, objective, impartial, and impressed.



PC MAGAZINE

▶ EDITORS' CHOICE

• Sybase SQL Server for NetWare

For its state-of-the-art feature set and blinding speed, Sybase SQL Server for NetWare wins our Editors' Choice. The product supports on-line backup, stored procedures with control logic, server-based referential integrity through triggers, and more.

(fc
tu
ar
pl
M
an
be
de

Gupta Technologies' SQLBase Server NLM earns an honorable mention. Though it lacks some of SQL

support is relatively light, SQLBase is a good choice for companies without an existing database.

companies with databases on many platforms, and Novell's NetWare SQL is especially well suited for companies

In the September 15 issue of PC Magazine, SYBASE SQL Server™ for NetWare was the top-rated database, beating 6 other products, including Oracle Server for NetWare.

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Client/server strategies

DEC's Pathworks put on track

By Elisabeth Horwitt

BOSTON

Digital Equipment Corp. will showcase beta versions of its Pathworks for Microsoft Corp. Windows NT and Novell, Inc. NetWare products at this week's Networld '93 in an effort to persuade attendees to make VAX and Alpha systems key components of their client/server strategies.

DEC's gradual Pathworks rollout is aimed at enabling a broad range of client systems to share files and access services transparently across DEC, Microsoft, Apple Computer, Inc. and Novell servers, a company spokeswoman said.

The future fate of DEC systems at S. G. Warburg & Co. will depend, to some extent, on the vendor's ability to provide cost-effective, functional integration with NetWare via Pathworks, according to David Wu, a computer analyst at the New York investment firm. "But they'd better hurry up."

A former all-DEC shop that now uses the original Microsoft LAN Manager-based Pathworks, S. G. Warburg is now thinking of phasing out both DEC and Pathworks in favor of a mixture of Sun Microsystems, Inc. and NetWare servers and Microsoft Windows clients, Wu added.

The NetWare version of Pathworks is due out in the second quarter, or about six months late, DEC said. It will finally enable users to use Novell's IPX transport protocol to access file and printer services on both NetWare and VAX OpenVMS servers, a DEC spokeswoman said.

"Users have been begging for this for years," said Joanne Correia, a program manager at International Data Corp. and a former DEC office systems product manager. DEC's current NetWare Coexistence product requires users to load DECnet to access VAX services and load IPX to access NetWare services — overloading the PC's memory in the process, she added.

The level of integration provided by Pathworks for NetWare will ultimately determine whether many users retain their DEC hosts as they move down to local-area networks, Correia and users indicated.

Ed Honko, a VAX systems manager at Dr Pepper Co./The Seven-Up Co., spoke for a number of users when he questioned whether Pathworks will provide enough value-added functionality to justify both its price and memory overhead. The beverage firm now uses Interconnections, Inc. software, which "makes a VAX look like a NetWare file and printer server" without using up much memory, he said.

Pathworks 5.0

DEC is expected to preview Pathworks 5.0, which will provide integrated file- and resource-sharing and integrated management functions across a mixed network operating system environment. Users will also gain ease-of-use features such as a Windows-based GUI and "intuitive management of installation and operation" across the different types of Pathworks servers, DEC said.

DEC's enterprisewide electronic-mail system is the kind of value-added service that could help convince users that DEC hosts bring something worthwhile to NetWare LAN installations, Correia said.

However, Pathworks for NetWare clients will not be able to use their native IPX protocols to access DEC host enterprise applications such as E-mail, multihost SQL database access and IBM host gateways, a DEC spokeswoman said. Instead, they must risk PC memory overload by adding either DECnet or Transmission Control Protocol/Internet Protocol.

In addition, NetWare Message Handling System users must still install a special gateway in order to exchange mail with DECmail users, the DEC spokeswoman said.

One issue for Dr Pepper/Seven-Up is DEC's insistence on charging for Pathworks on a per-client basis, "which makes it harder for us to sell additional PCs" to management, Honko said. Interconnections, like Novell, charges according to server functions, "and clients are basically free," he added.

LAN/Mainframe connectivity

Microsoft widens WFW links

By Michael Vizard

BOSTON

Microsoft Corp. will announce plans at this week's Networld '93 to expand the networking infrastructure for Windows for Workgroups by adding support for Transmission Control Protocol/Internet Protocol (TCP/IP) and MS-Data Link Connection (MS-DLC) transports.

The additional network support is intended to give applications that are compatible with Windows for Workgroups software transport mechanisms that will link those applications with services running on Unix and IBM mainframe systems, respectively.

In addition to TCP/IP and MS-DLC transports, Microsoft last week announced support for Banyan Systems, Inc.'s Vines network operating system.

Microsoft will provide Windows users with a network protocol-independent environment.

Growing product line

The addition of these three transports brings the number of network protocols supported by Windows for Workgroups to six. It already supports Novell, Inc.'s NetWare, Microsoft's LAN Manager and Pathworks, a derivative of LAN Manager offered by Digital Equipment Corp.

Windows for Workgroups is a set of application utilities bundled with Windows 3.1 that was designed to make it easier to create network applications. It includes support for electronic mail and group scheduling and is described by Microsoft as a platform for building future applications.

Patrick Fox, Microsoft's product manager for Windows for Workgroups, said additional network protocol support for the product is consistent with the company's plans to provide Windows users with a network protocol-independent environment.

According to Fox, Windows for Workgroups is groupware in that it provides mail and scheduling software, but it is not a groupware application like Lotus Development Corp.'s Notes, which includes a database and forms routing capabilities.

"Microsoft has created a lot of confusion with Windows for Workgroups. It's essentially a peer-to-peer communications platform," said Neil Hill, a senior industry analyst at Forrester Research, Inc. in Cambridge, Mass. "But as far as we can tell, no application is using it yet," he added.

For that reason, Microsoft may be a little premature in terms of extending network protocol support, Hill said.

Fox, however, countered that the company expects users to deploy applications for Windows for Workgroups in a variety of environments, as opposed to limiting Windows for Workgroups to sites with LAN Manager or NetWare servers.

In the short term, though, Hill suggested that Microsoft still has several compatibility issues to address with Windows for Workgroups. "It doesn't run over the same Ethernet drivers as NetWare. It also presents a problem because you are running a peer-to-peer network over a NetWare file server network," he said.

At Microsoft, Fox responded that the company is currently satisfied with its support for NetWare. "We ran Windows for Workgroups successfully at 1,200 beta-test sites, and many of these sites were active NetWare sites," Fox said.

NetWare for SAA sets expanded net support

By Elisabeth Horwitt

SUNNYVALE, CALIF.

■ **With the latest release of NetWare for SAA last week, Novell, Inc. has significantly broadened the local-area network-to-mainframe software's already strong appeal for IBM/NetWare shops, according to Cindy Santisario, International Data Corp. senior analyst.**

A NetWare Loadable Module announced in 1990, NetWare for SAA garnered more than half of the NetWare-to-host gateway market in 1991 and is still a clear market leader, Santisario said. A major advantage of the product was its ability to support 508 concurrent sessions, enabling users to consolidate stand-alone coaxial connections as well as cluster controllers and gateways that handled far fewer sessions, she added.

With the introduction of NetWare for SAA Version 1.3, Novell is significantly expanding the range of LAN protocols, LAN-to-host connections and micro-to-mainframe applications it supports.

Types of features

Key components of the product include the following:

- Support of LU0, an older IBM protocol used primarily by banks. This capability will support banks that are moving their branch offices to NetWare but want to maintain the old applications, a Novell spokesman said.
- Support for any network board that supports the latest version of Novell's Open Data Link Interface.
- Ability to download configurations automatically to NetWare for SAA servers from a host.
- Support from leading micro-to-mainframe software vendors Attachmate Corp. and Eicon Technology Corp. Synchronous Data Link Control drivers from Eicon and Microdyne Corp. will be bundled with the new release.
- An Open NetView Application Programming Interface, now available for NetWare for SAA, allows programmers to develop applications that enable NetWare-compatible network devices to be managed by NetView without having to deal with either NetView or IBM Systems Network Architecture commands.

Available now, NetWare for SAA Version 1.3 prices start at $1,995 for a server supporting 16 sessions.

Systems Center, Inc. announced Solve:LAN for NetWare, software built on NetWare for SAA that allows the vendor's host-based Net/Master product to manage NetWare LANs, Systems Center said. A Solve:LAN package is priced at $20,000.

New Vines, ENS for NetWare ship

By Michele Dostert
BOSTON

Banyan Systems, Inc. hopes to upstage the competition at the Networld '92 show this week with a spine-tingling stunt. The Westboro, Mass., network software firm will announce that it has shipped two major products on time and with all promised features — a feat almost unheard of these days in the vaporware-prone local-area network marketplace.

Banyan's on-time shipment of both Vines 5.50 and the first release of its Enterprise Network Services (ENS) for Novell, Inc.'s NetWare will surely be noticed by users who are still waiting for Novell's overdue NetWare 4.0 and Microsoft Corp.'s long-promised 32-bit version of LAN Manager.

"Banyan surprised me, and probably everybody else, by getting these two products out the door so quickly," said John Kriek, a senior analyst at Datapro Information Services Group, a Delran, N.J.-based market research firm.

Vines versions combined

Vines 5.50 is the "merge release" of Vines 4.11 and Vines 5.0 that Vines users have been demanding ever since the release of the latter in late 1991. The new release combines the broad third-party product support found in Vines 4.11 with the improved file system, file naming and full Apple Computer, Inc. Macintosh support found in Vines 5.0.

Vines 5.50 is more than just a merge release, however. It also includes new support for Integrated Services Digital Network and T1 high-speed wide-area network links as well as a new generation of Banyan's acclaimed StreetTalk directory services.

StreetTalk III has been modified to allow users to attach an unlimited number of attributes to objects stored in the StreetTalk directory. "The new attributes will let you look up, for example, an engineer in your Dallas office who speaks German or a laser printer on the third floor that has a certain font loaded," said William Ifrah, product manager for StreetTalk.

The new version also includes application programming interfaces that third-party vendors can use to integrate their own directory structures with StreetTalk, as well as new management utilities that make it easier to add and delete users across the network.

Beta-test users of Vines 5.50 were enthusiastic. Jeff Kozman, a computer coordinator at Ensearch Exploration, a Dallas-based oil and gas exploration company, said, "I'm definitely going to migrate to it. It has great Windows support; you can now log in and out of the network without exiting Windows." He also expressed interest in the T1 support for accessing remote sites.

ENS for NetWare will provide enterprisewide directory (StreetTalk), messaging, network management, security and administration services currently unavailable in NetWare environments.

Novell has promised to deliver these same services in NetWare 4.0, which was promised for year-end 1992 and is now expected by the end of the quarter. Many large NetWare sites will wait for Novell rather than add another vendor to their network. But some NetWare sites that are either unwilling to wait or unwilling to upgrade are looking at ENS.

"Two years ago we almost switched everybody to Banyan just so we could get StreetTalk. That's how bad we need distributed directory," said Patrick Carney, information systems director at ASEA, Brown, Boveri's North Brunswick, N.J., power engineering division. "But I spent the last year getting my NetWare 3.11 LANs up to 99.8% reliability, and we don't want to mess that up by upgrading to NetWare 4.0."

Carney said he is eager to look at ENS because a distributed directory on NetWare v3.11 would be the best of both worlds for him.

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News Shorts

WordPerfect gains Grammatik

WordPerfect Corp. has purchased a controlling interest in **Reference Software International**, a San Francisco-based developer of software writing tools and electronic reference works. Through the acquisition, WordPerfect acquires Grammatik, a grammar-checking software program currently bundled with Lotus Development Corp.'s Ami Pro, Microsoft Corp.'s Word for Windows and WordPerfect 5.2 for Windows, as well as proprietary computer linguistics expertise.

CA upgrades accounting software

Computer Associates International, Inc. has released CA-BPI Accounting II, an accounting package for small to medium-size businesses. In addition, in an attempt to reduce piracy, CA is allowing unregistered BPI users to upgrade to the new package for $209. Registered BPI ValuePak clients with SupportPlus can upgrade to the new module for $99. ValuePak clients without SupportPlus pay $149, and SupportPlus without ValuePak customers pay $119. All other registered clients pay $169.

Workers hurt in DEC accident

Eighteen construction workers at the building site for **Digital Equipment Corp.**'s new semiconductor plant were accidentally injured last week when a floor collapsed while concrete was being poured. Most of the injuries were minor, and none were life-threatening, according to a DEC spokeswoman. The Hudson, Mass., building is slated to become a major manufacturing site for DEC's Alpha AXP reduced instruction set computing chips when the facility becomes operational in 1996.

Network manager on ice

MTI Technology, Inc. in Anaheim, Calif., is freezing development of its Lexcel division's Lance+, a Simple Network Management Protocol-based network management software product. MTI said Lance+ will be frozen at Version 3.1.2, scheduled to ship this month, while the company refocuses on the network-attached system storage market.

Interactive reborn

Interactive Systems Corp.'s system software and networking business last week returned to its original owners when Ronald D. Lachman, developer of the Unix networking products, bought the line from **SHL Systemhouse, Inc.** SHL had acquired the Interactive products from **Eastman Kodak Co.** last month. The software includes the code base for Sun Microsystems, Inc.'s Network File System for Unix System V.

SHORT TAKES **Intel Corp.** promoted Craig R. Barrett from executive vice president to chief operating officer in a move that appeared to solidify Barrett, 53, as the heir apparent to Andrew S. Grove, Intel's president and chief executive officer.... **AT&T** signed an agreement to provide the National Science Foundation with directory and database services for the NSFnet data network.... **Computer Sciences Corp.** and partner **Coral Systems, Inc.** will provide Coral's FraudBuster antifraud software to **LM Ericsson**, a leading maker of cellular switching systems.... **Mead Data Central, Inc.**, the Dayton, Ohio, provider of the Lexis and Nexis research services, last week acquired **Folio Corp.**, a Provo, Utah-based information management local-area network and PC software firm.... **Network General Corp.** and **Hewlett-Packard Co.** announced a program for certifying network managers to perform network protocol analysis and troubleshooting with either Network General's Sniffer or HP's Network Advisor.

Net kings link switches, servers

CONTINUED FROM PAGE 1

stored in computer networks. Other PBX links are slated to follow.

The firms indicated that the move is only the beginning of a series of ongoing LAN-to-WAN integration efforts between the two companies. For example, "both companies are anxious to get on with network management and directory services integration," said Barry Karafin, vice president of marketing and strategic planning at AT&T. "There's a big payoff for users there."

"Synchronizing directories on PBXs and LANs would be useful because users are currently maintaining two sets of resources," said Jodi Mardesich, an analyst at The Burton Group in Salt Lake City. "But today, the LAN and telecommunications worlds are [technically and organizationally] very far apart. For example, who would end up buying and maintaining networks: the LAN or the phone people?"

No big deal?

For the near term, though, most users interviewed did not appear any more excited about putting a voice module on their LAN servers than they have historically been about linking PBXs with host computers via such products as IBM's CallPath.

"I haven't heard one user say they want telephony services on their Novell servers," said Gordon Craig, vice president of the Austin NetWare Users Group in Austin, Texas.

"I'm absolutely not interested in combining voice and data networks," asserted Bob Michna, vice president of enterprise utilities at Aetna Life & Casualty Co. in Hartford, Conn., who oversees both LANs and telecommunications at the insurer. The reason, he said, is that voice users are accustomed to a high level of reliability that cannot yet be matched in the LAN world.

Mark Brooks, president of NetWare Users International, however, noted that host-based computer-integrated telephony options have traditionally been very expensive and that the pending Telephony Services NLM could represent an opportunity for users to economically downsize their voice applications as they have their data. The vendors, however, offered no ballpark pricing figures.

"I can see a potential battle down the road, with LANs trying to become your voice mechanism and PBXs trying to become your data network," said Frank J. Rezac, project manager in the office of telecommunications control for the city of New York. "With the vendors getting together, it's like the two enemies are signing the treaty before the war."

LAN and WAN unite

- **NetWare server** to function as a data/voice integration platform for Novell and AT&T's collective 40 million network nodes.

- **Initial Telephony Services NLM** will include AT&T Passageway application, which allows users to speed-dial and store notes about phone calls. Upcoming applications are slated to integrate E-mail, fax and voice mail.

- **APIs** will be available in Novell's software developer's kit and from AT&T under as-yet undetermined conditions to allow third parties to develop voice-enabled NetWare applications. They will be revealed at Novell's developer's conference in March.

Remote NetWare access upped

As AT&T and Novell prepare to forge a brave new world in voice and data communications, Novell is updating its communications server to improve remote communications between NetWare-based LANs and the asynchronous world.

Novell has announced NetWare Access Services v1.3, a remote access program that allows up to 16 remote users to dial into a NetWare network and run multiple DOS and Microsoft Corp. Windows applications concurrently, sending only screen information, keystrokes and mouse signals over the phone line.

The release adds Windows applications support and enhanced memory management to allow multiple applications to run efficiently. NetWare Access Services also allows customers to consolidate modem access onto one NetWare Asynchronous Communications Services v3.0 server. —*Michele Dostert*

Remote CC:Mail reaches out to PowerBook users

By Lynda Radosevich

CAMBRIDGE, MASS.

■ **Lotus Development Corp. announced last week that it is shipping the long-awaited remote version of its CC:Mail for Macintosh electronic-mail program. The DOS version has been available for eight years.**

The move allows corporate users of Apple Computer, Inc.'s portable PowerBook computer to remotely exchange mail with their office's CC:Mail systems. The product will be on display at Networld '93 in Boston this week.

"We wanted a secure interface that allowed our traveling executives to easily communicate with the office from around the globe," said Hans Mueller, a project manager at US West Advanced Technologies in Boulder, Colo.

Initially, the company tried supplying its executives with software that let them remotely access the desktop computers in their offices. They had to log on to the office network, then open up the E-mail application before exchanging mail.

Direct access

With CC:Mail Remote for Macintosh, Mueller said, the executives can exchange messages directly through the mail server, reducing complexity and the amount of time they spend on long-distance lines.

CC:Mail Remote for Macintosh, which lists for $295, lets users create messages off-line and store them in an "out box" for later transmission. It minimizes connection time by using a batch transmission mode to retrieve messages while sending them, Lotus said. An automatic directory exchange feature lets remote users synchronize their directory with the directory on the office network, and message delivery can be scheduled to occur at a preselected time.

Jeff Francis, associate director of information services at Harvard Medical School in Boston, evaluated CC:Mail Remote for Macintosh for the school's faculty and researchers, who are located in hospitals throughout the city. More than 1,000 PowerBook and remote Macintosh users had no access to the school's CC:Mail-based E-mail system except by using CC:Mail Remote for DOS and a PC emulation program that did not work well, he said.

The Macintosh product "fills a hole in our E-mail strategy," Francis said.

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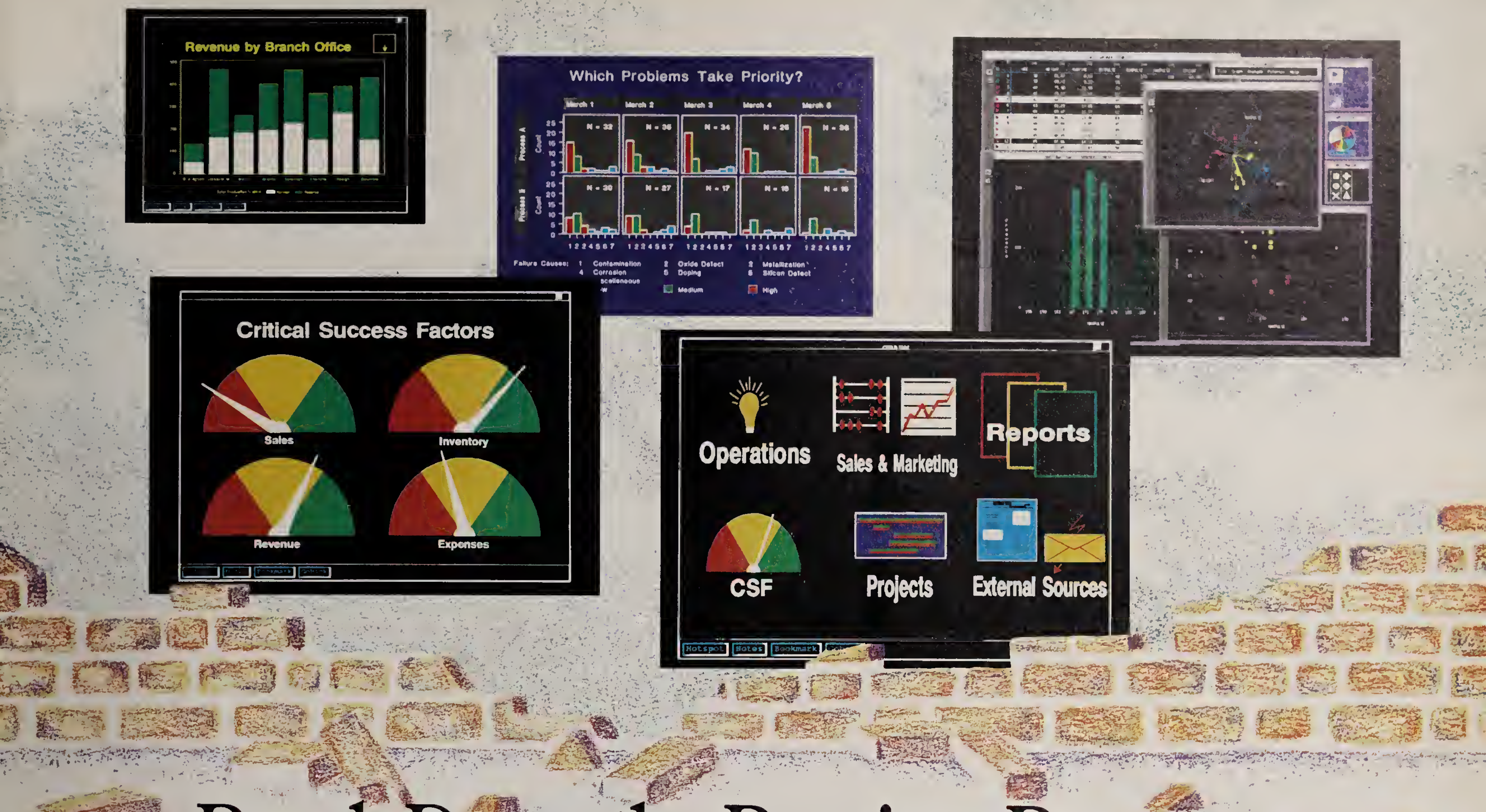

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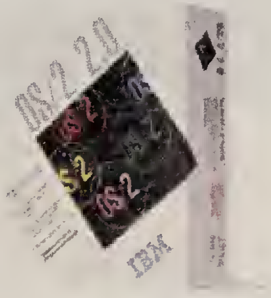

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IBM

Feds overhaul national weather system

By Gary H. Anthes
WASHINGTON, D.C.

PRC, Inc. has won an 11-year, $227 million contract to build the computer and communications system that will form the heart of the nation's new weather forecasting service.

McLean, Va.-based PRC, a subsidiary of Black & Decker Corp., will deliver the Advanced Weather Interactive Processing System (AWIPS), which is one of four cornerstones of the National Weather Service's 15-year, $4 billion modernization effort (see story below).

AWIPS combines and graphically displays weather observations from several sources and is the chief automated tool to be used by meteorologists at local forecast offices. It is key to the weather service's effort to reduce labor costs by automating much of what forecasters now do manually.

Joe Friday, assistant administrator at the National Weather Service, said the cost of the system's overhaul will be recouped many times over in crop- and property-loss savings from better forecasts. He said already-installed superaccurate Doppler radars have increased the accuracy of severe storm forecasts from 60% to more than 85%, and a prototype of AWIPS running in Colorado has reduced by two-thirds the number of false alarms for severe storms.

AWIPS will replace a 1970s-era system that required weather forecasters to scurry around local forecast offices — from radar screen to teletype to clipboard — to gather the data required to prepare a forecast. With AWIPS, from two to 10 times as much data will be integrated automatically for display and analysis on a single, high-end Hewlett-Packard Co. workstation.

Other major input to AWIPS will come from new weather satellites, automated surface weather sensors and computer-generated forecast model information from the weather service's central computers near Washington, D.C.

Aided by software from HP and Atmospheric and Environmental Research, Inc. in Cambridge, Mass., meteorologists will be able to overlay and animate images and graphics in order to get a better understanding, in near-real-time, of what is going on in their forecast areas and to perform the computations needed to generate a forecast.

Under the new system, forecasters will be able to try different forecast models on recent weather data, see which model fits best and then use that model to prepare the next forecast, said Harold G. Wilson, a PRC vice president. "This kind of capability has never been put in the field before," he added.

Not in vane

Components of the $4 billion forecasting service include:

- Nexrad: Next Generation Weather Radar is replacing 1950s-era radar with sophisticated Doppler units, which measure precipitation and detect the rotational patterns of violent storms.
- ASOS: Automated Surface Observation Systems is automating the manual collection of surface weather data though a nationwide network of smart sensors.
- GOES Next: The next generation of Geostationary Operational Environmental Satellites will offer several times greater resolution than existing satellites for precise tracking of severe weather.
- AWIPS: The nerve center of the forecasting offices, the Advanced Weather Interactive Processing System integrates and displays data from Nexrad, ASOS and GOES Next.

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Father of Basic leaves legacy

By Kim S. Nash
HANOVER, N.H.

A memorial service was held last week for John Kemeny, co-creator of the Basic computer language, who died unexpectedly of heart failure.

Kemeny, 66, worked with fellow Dartmouth College professor Thomas Kurtz to author Basic, which is among the most widely used computer languages worldwide, in 1964. Kemeny also developed the Dartmouth Time-Sharing System to split CPU time between educational and research tasks at Dartmouth.

"John Kemeny pushed the fields of mathematics and computing to new heights, just as he raised the stature of Dartmouth during... the 1970s," said Dartmouth President James Freedman.

Survived by his wife and two children, Kemeny was instrumental in bringing female students into the formerly all-male college in 1972, a college spokesman said. In 1979, Jimmy Carter named Kemeny to head a 12-member presidential commission to investigate the Three Mile Island nuclear power plant accident. The Kemeny Commission's report was highly critical of the nuclear power industry and federal regulators.

John Kemeny's Basic *is one of the most popular computer languages in the world*

After a childhood spent in Budapest, Kemeny and his family moved to New York in 1940. With a Ph.D. in math from Princeton University in his pocket, the 23-year-old Kemeny taught at his alma mater before taking a professorship at Dartmouth four years later.

He later became mathematics chairman and was college president from 1970 to 1981, when he returned to teaching. He taught until 1990 and continued an active involvement with the college until his death.

He received more than 70 honorary degrees and awards, including the Institute of Electrical and Electronic Engineers Computer Pioneer Medal in 1986 and the IBM Louis Robinson Award in 1990.

Kemeny wrote *A Philosopher Looks at Science* and *Man and the Computer: A New Symbiosis*. He co-authored 13 books, including *Basic Programming*.

A scholarship fund has been established in his name at Dartmouth.

Basically

Some developers have decried Basic's relatively simple English-like syntax as inflexible and inefficient. Others have criticized it for promoting bad code. Despite the outcry, developers — particularly of microcomputer software — have embraced it in droves. More than 5 million developers program PCs in Basic, according to market estimates. That does not include programmers of Digital Equipment Corp., IBM and Hewlett-Packard Co. equipment, which still offer versions of Basic for their minicomputer and instrument-control systems.

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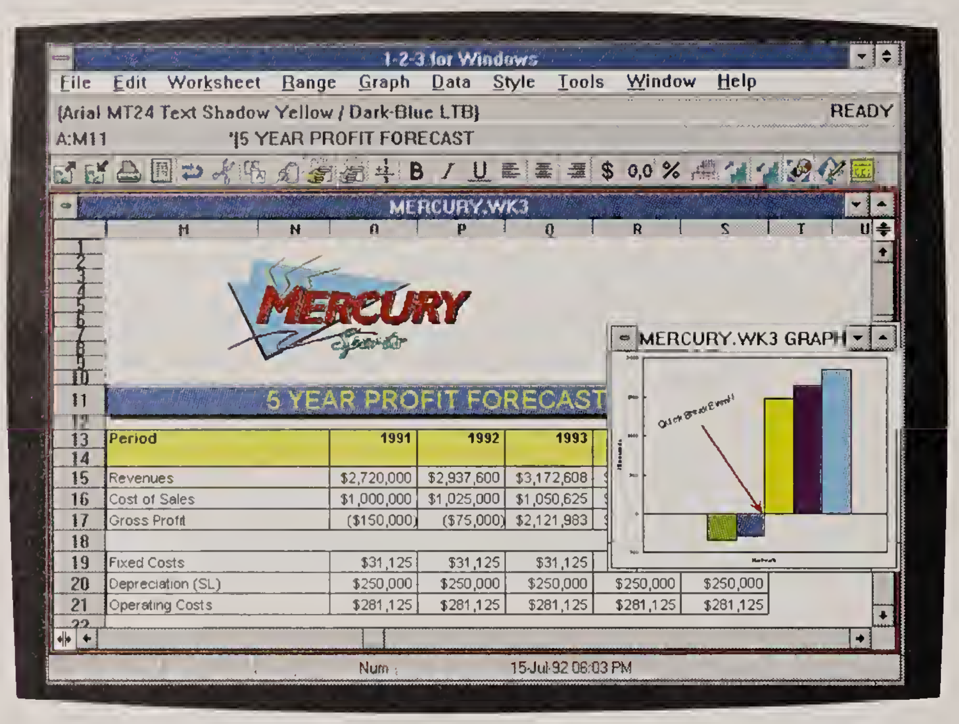

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5 YEAR PROFIT FORECAST

Period	1991	1992	1993		
Revenues	$2,720,000	$2,937,600	$3,172,608		
Cost of Sales	$1,000,000	$1,025,000	$1,050,625		
Gross Profit	($150,000)	($75,000)	$2,121,983		
Fixed Costs	$31,125	$31,125	$31,125		
Depreciation (SL)	$250,000	$250,000	$250,000	$250,000	$250,000
Operating Costs	$281,125	$281,125	$281,125	$281,125	$281,125

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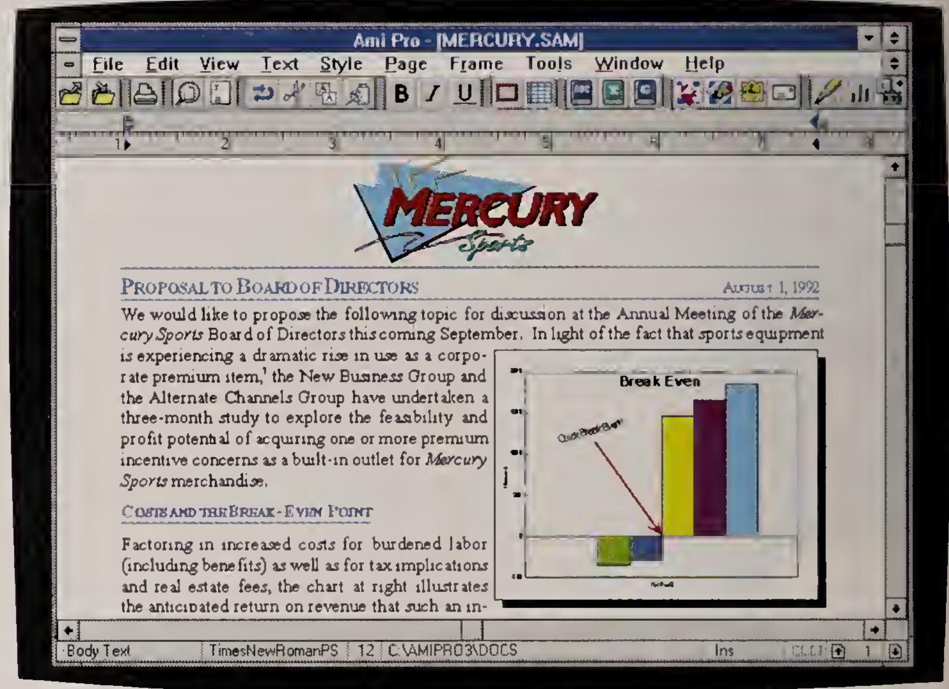
1-2-3 for Windows Release 1.1 now includes over 25 new features and usability enhancements.



PROPOSAL TO BOARD OF DIRECTORS AUGUST 1, 1992

We would like to propose the following topic for discussion at the Annual Meeting of the *Mercury Sports* Board of Directors this coming September. In light of the fact that sports equipment is experiencing a dramatic rise in use as a corporate premium item,[1] the New Business Group and the Alternate Channels Group have undertaken a three-month study to explore the feasibility and profit potential of acquiring one or more premium incentive concerns as a built-in outlet for *Mercury Sports* merchandise.

COSTS AND THE BREAK-EVEN POINT

Factoring in increased costs for burdened labor (including benefits) as well as for tax implications and real estate fees, the chart at right illustrates the anticipated return on revenue that such an in-

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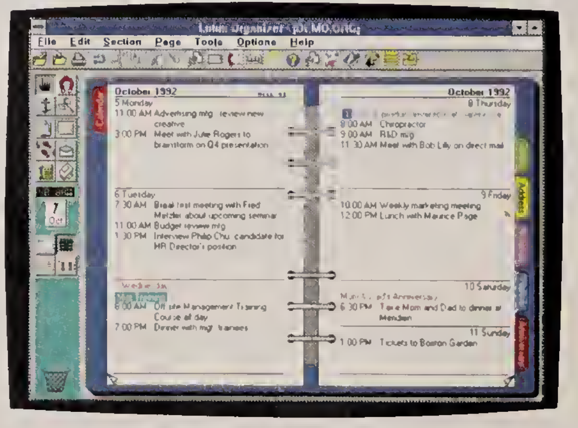

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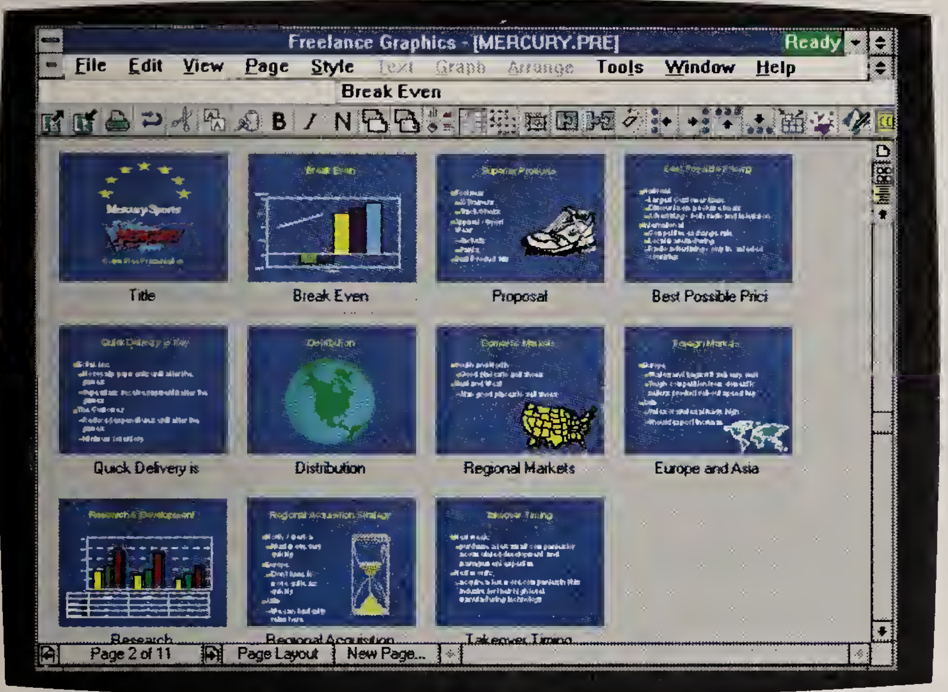

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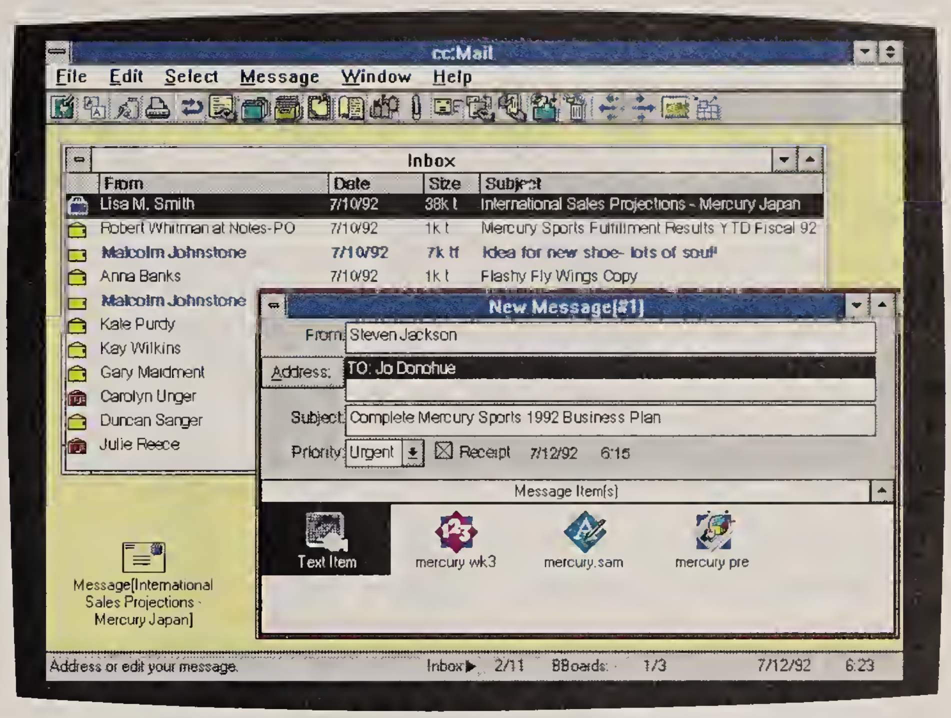

From	Date	Size	Subject
Lisa M. Smith	7/10/92	38k t	International Sales Projections - Mercury Japan
Robert Whitman at Notes-PO	7/10/92	1k t	Mercury Sports Fulfillment Results YTD Fiscal 92
Malcolm Johnstone	**7/10/92**	**7k tt**	**Idea for new shoe- lots of soul!**
Anna Banks	7/10/92	1k t	Flashy Fly Wings Copy
Malcolm Johnstone			
Kale Purdy			
Kay Wilkins			
Gary Maidment			
Carolyn Unger			
Duncan Sanger			
Julie Reece			

From: Steven Jackson
Address: TO: Jo Donohue
Subject: Complete Mercury Sports 1992 Business Plan
Priority: Urgent ☒ Receipt 7/12/92 6:15

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Looking forward to Office 2001

Multimedia, collaborative technologies will find their niche in the office of the future

Ringing in the new year, four professionals well-acquainted with information technology predict how working life will be different in the year 2001.

WORKERS WILL NEED ELECTRONIC "filters" to cope with the volumes of electronic mail, voice mail and extensive databases that will be at their disposal 10 years hence, said Paul Saffo.

Paul Saffo *is a senior fellow at the Institute for the Future*

"We will have very powerful new information tools, and they will have to become tools of convenience and empowerment, rather than electronic dog leashes," he said during a recent phone interview from India. Travel will cause around-the-clock interruptions if users are not careful, undercutting productivity gains.

"The line between the business day and home life will continue to blur," he said, speaking at 7:30 a.m. Bombay time.

The key to handling time-zone differences will be new office etiquette. "We're going to develop new social rules," Saffo said. "The single most critical skill for office workers in the next decade will be context-switching. We will find polite ways to switch context quickly and to respond to interrupt-driven pressures." That might change expectations for how quickly a phone call is returned or when E-mail gets an immediate answer.

At the same time, electronic data interchange between corporations will blur the lines between global enterprises, Saffo said.

"We will end up with organizational structures that are very fluid," Saffo predicted, "because companies will be making and breaking alliances based on constantly changing market conditions." —*Jean S. Bozman*

MULTIMEDIA WILL PROVIDE AN enormously rich and flexible environment in which corporations and their customers interact, said Colin Crook.

Colin Crook *is chairman of the corporate technology committee at Citibank NA*

"It'll be a very rich environment that lets us construct solutions by getting a group of like-minded people together quickly. At the moment, we compromise to solve problems," he said.

Crook is realistic, however, about how quickly this platform will be adopted. "We'll go through a fairly torturous learning curve, I'm afraid," he said.

What will companies use to judge the efficacy of these environments? "We'll try and get a series of technological processes that give [work teams] the minimum things necessary to work as a team," he said. "I think this will be a fairly harsh filter."

Crook also said he anticipates some built-in systems to monitor the success of different forms of working and virtual teams. "The things that work are the ones you go back to; the ones that don't, you stay away from. It will be sort of Darwinian. Likewise, the teams that work well will stay together in this dynamic organizational structure."

Flexibility is the key and will be the hallmark of business by 2001, according to Crook. Productivity in the service sector did not increase despite substantial investments in technology during the past 15 years, he said, because "we poured cement over the service industry with a lot of [data processing]." —*Ellis Booker*

BY THE END OF THE CENTURY, ubiquitous PCs, workstations and computer networks will be marshaled to automate group tasks using sophisticated workflow software, said Ann Palermo.

Ann Palermo *is the director of workgroup and messaging research at International Data Corp.*

Already, she noted, the first application on this local-area network infrastructure — electronic mail — is being enhanced with calendaring and scheduling systems. "The most significant difference we'll see in the way people work 10 years from now will be the greater use of collaborative technologies," Palermo said.

Different types of information will also come together, which will make multimedia and compound documents at the desktop commonplace. Likewise, she said, the distinction between the computer system and the phone system in an office will fade away.

Naturally, integrating these ways of communicating will require building a network infrastructure, which Palermo said will be a major challenge.

Automation of routine business processes will also serve to sweep a clear path for users, many of whom complain about the glut of information and E-mail on their desktops.

For this reason, Palermo was optimistic about office productivity. "We're going to see a huge jump in productivity by 2001," she predicted. "We're getting smart and starting to automate business processes instead of just tasks." —*Ellis Booker*

COMPUTERS WILL BLEND WITH the furniture in the office of the year 2001 as they evolve into consumer-electronic devices that can be tossed around like calculators or attached to the wall.

That is the vision of Mark Weiser, who advocates ubiquitous computing. "Using a computer should be like a walk in the woods," said Weiser, who works with psychologists and anthropologists at Xerox Corp.'s Palo Alto Research Center (PARC) to fashion a work style for the year 2001.

Mark Weiser *directs the computer science lab at Xerox's PARC*

At first glance, a walk in the woods may appear to be an uneventful activity, but the woods contain layers and layers of information if one pauses to inspect things more closely, he said.

In much the same way, computers will not demand a user's attention all day by the year 2001, Weiser said. Rather, computer use will become more casual, as desktop PCs give way to mobile computers. New input devices will replace keyboards, encouraging people to walk around with them. "The whole idea of having a box on your desk is completely wrong," Weiser said. "We've got to learn how to get the computer out of the way."

Weiser has advocated — and tested — computer "badges" at PARC that signal the wearer's location to others. This allows people on the East Coast to "sense" if a phone call would disturb a West Coast worker. Electronic notes, will be attached to pictures or coffee cups.

While he can imagine drawbacks to this and other mobile technologies, Weiser predicted that productivity will increase once users no longer feel tethered to deskbound PCs. "People are more productive when they feel that they're in a community," Weiser said. —*Jean S. Bozman*

The office space circa 2001

- High-speed local- and wide-area networks will connect teams of workers whose actions are coordinated by work-flow software.
- Multimedia will consolidate text, sound, image and video on the desktop; visualization systems make massive databases comprehensible.
- Lightweight voice/data devices — many of them pen-based — will give workers unprecedented mobility.
- Electronic filters and intelligent "agent" software will help users cope with an overabundance of digital information.

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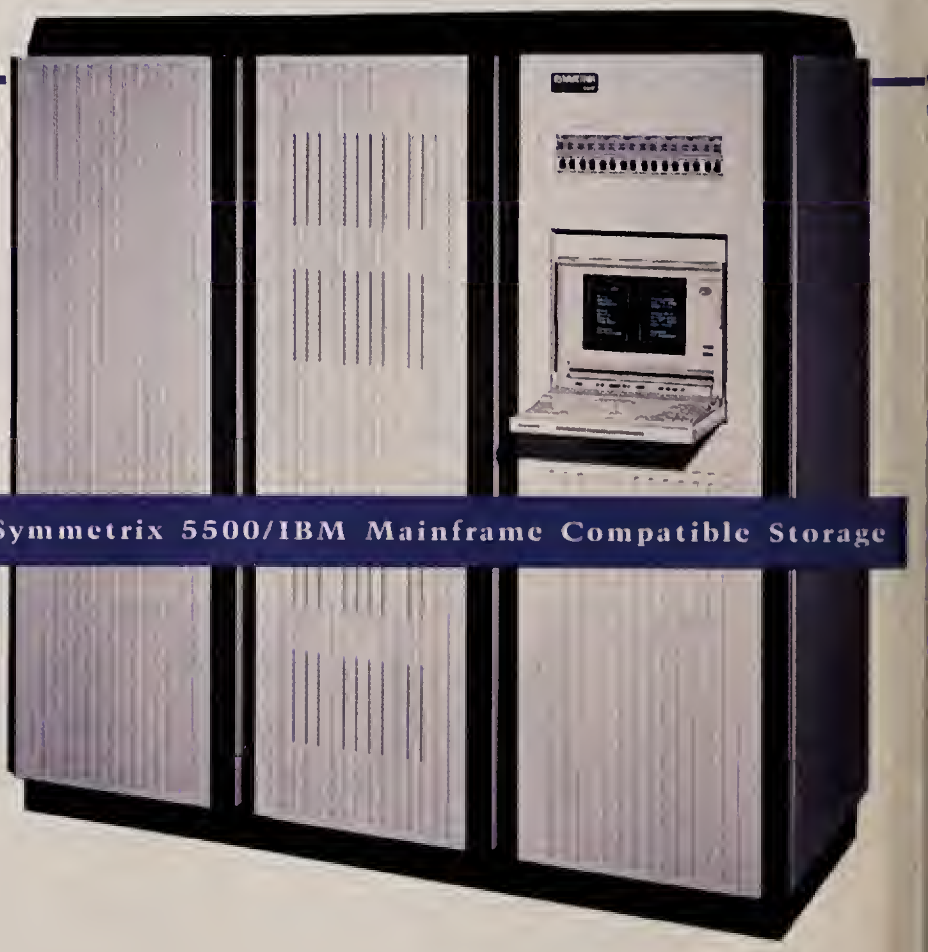

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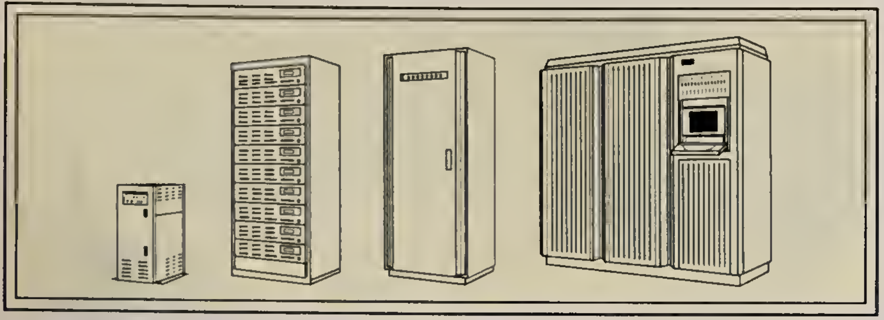

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Open letter

To: Bill Clinton
From: Bill Laberis
Re: National high-tech policy

Dear Bill,

You'll soon be terribly busy setting our nation's course on a variety of vital matters, so I thought I'd quickly help you resolve the nagging issue of determining the country's high-tech industrial policy.

Simply put, there can be no one viable policy action or statement. Rather, you should embark on a series of consistent actions to ensure that our readers — corporate consumers of high-tech products — will have a steady stream of innovative, productivity-enhancing tools that will keep their companies competitive in the global market. A lack of consistency in past administrations has given the country the look and feel of having no high-tech policy.

For example, a few years ago one of our Asian competitors and an alleged ally sold sophisticated weapons technology to the Soviets. We should have retaliated with sanctions but we didn't, mainly because the same company was a key supplier of chips to U.S. computer companies. When you want it both ways, you end up without any recognizable policy.

So here's what to do and what not to do.

Don't mess with the current means of access to capital by emerging high-tech companies. The U.S. has a well-defined venture capital environment that is fully capable of sorting out the winners and losers. They don't need public funds, or more specifically, the politically tainted means by which public funds are dispersed.

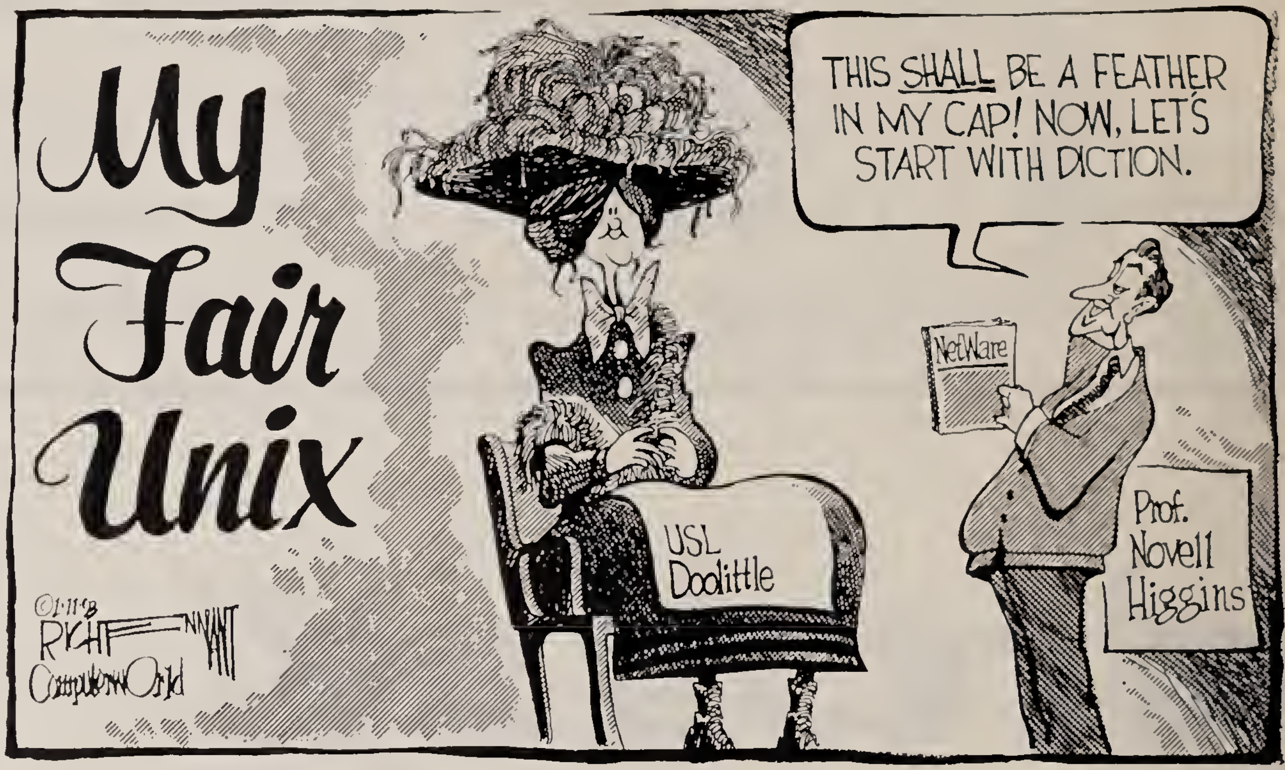
Some of our competitors have willfully dumped high-tech products, such as chips, to force U.S. companies out of the market (successfully in some cases, I might add). Dumping should be considered a hostile assault on our economic bulwarks and therefore dealt with in a similarly hostile manner. Given a free market, chip companies such as Intel and Motorola have shown that U.S. firms can out-compete the world, but not if others are allowed to play dirty.

Rigorously enforce our patent and copyright system in the international community. As with the matter of dumping, retaliation is an economic matter. We are, after all, still the biggest discrete marketplace in the world for the goods of other nations. No one wants to be shut out of this market, not even for a little while.

And, by far the most important aspect of a high-tech policy, do something definitive to ensure that U.S. companies will have an educated and skilled work force in the future. You can start right in your new neighborhood in Washington, D.C., where you've deemed the public schools so inadequate that you won't even send your daughter to them.

Bill Laberis

Bill Laberis, *Editor in chief*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NetWare
USL Doolittle
Prof. Novell Higgins
RICH TENNANT ComputerWorld

Letters to the editor

Risky business

Ask Forrester Research, Inc.'s Janet Hyland "At triple the price of SNA, are large LANs worth it?" [CW, Dec. 7] if she would feel safer taking a Trans-Pacific flight in a single-engine or multi-engine aircraft. Ask her if she's had a flat tire and found that she had no spare.

One of the perspectives shared by more experienced information systems professionals is that of seeing the single superserver (then called a mainframe) crash badly, bringing the entire organization to a standstill.

It was this kind of occurrence that led to distributed computing and created the environment for the proliferation of minis and micros.

Although Hyland's approach to reducing costs is commendable, she should realize that a balance must be struck between operational efficiency, support personnel and the disastrous costs of being unable to do business when the single high-capacity superserver goes down.

S. W. Holland
Richmond, Va.

Not picture perfect

Things do look a bit grim for Philippe Kahn and Borland International as noted on the front page of the Dec. 14 issue. Even if things are grim, isn't there a less grim photograph that could have been used of Mr. Kahn?

It certainly didn't look like one he would feel good about sending to his mother.

Stuart Sabel
Snohomish, Wash.

Change is good

After reading the letters to the editor regarding your redesign [CW, Dec. 14], I've come to the conclusion that even information systems professionals don't like change. The way I look at it, the content (as always) is good. . . nothing's changed. Keep up the good work.

Blair Jensen
Utah State
Developmental Center

Right chip, wrong team

Your column on Comdex exhibitors, "Reporter's Notebook," [CW, Nov. 23] aptly included the PowerPC family of reduced instruction set computing microprocessors among its list of predicted "chip survivors" of the 1990s. However, the piece went on to refer to the chips as "IBM/Apple" parts.

Though PowerPC microprocessors will be incorporated into future systems from both IBM and Apple, design efforts for the chips are being spearheaded by Motorola and IBM at the Austin, Texas-based Somerset design center, which was dedicated last spring.

The facility will employ a project team made up of 300 engineers, primarily from Motorola and IBM, with a small contingent of Apple employees. Moreover, Somerset engineers are implementing a design process that combines Motorola and IBM methodologies.

In addition to integrating design resources, Motorola and IBM will also manufacture and market the chips directly to OEMs. Apple will not be an OEM supplier for these parts.

Phil Pompa
Motorola, Inc.

Words to live by

My fondest wish is that people considering using client/server for bread and butter applications read "Is client/server a lot of hot air?" by John Gantz [CW, Dec. 21] before proceeding. On second thought, all the hacks, numskulls and information systems amateurs who grew up in the PC — not microcomputer — world should adopt Mr. Gantz's philosophy.

That philosophy should include an admission that measured business results are secondary, while empowering users, moving computers closer to decision makers and all the other buzzworded zero-talk is primary. Or more exactly, downsizing, rightsizing, distributed data and all the information industry manifestations of these trends have only one real objective: Keep all the folks peddling these unproven, risky, sometimes silly, populist practices earning a really good living.

Marshall J. Huntenburg
Parsippany, N.J.

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IS benefits don't always go where intended

Michael Sullivan-Trainor

Stop right where you are! You may be giving away your company's money!

In fact, if you're in IS, it's more than likely that you've already helped someone else besides the company's stockholders reap the benefits of your company's IS investments.

How is this possible when every ounce of your effort goes to making your company's use of systems more effective? Well, if you stop and think for a minute, you'll see that the value of IS often goes to customers, suppliers and sometimes even competitors rather than staying inside the company.

Take banking, for example. Before the advent of the automated teller machine (ATM), banks controlled customers' money. They held it to lend or invest for extensive periods between customer visits to make a transfer or withdrawal.

Now, with an ATM on every corner, customers have taken charge, transferring and withdrawing their money at will seven days a week, 24 hours a day. The value of the multimillion dollar ATM investment rests with the customer.

The bank may have gained some indirect benefits — such as customer loyalty — but the bottom line is that thanks to ATMs, the customer, not the bank executive, has greater control over the funds in that checking, savings or money market account.

MICHAEL SIGGINS

Look at manufacturing, where the investment in electronic data interchange is placing a company's information at the disposal of suppliers and business partners. Who reaps the greatest value from this exchange?

The manufacturers get greater responsiveness from the supplier and partners. But the partners gain greater control over the information about their transactions. The ultimate beneficiary may again be the customers, who have greater access to information about their orders instantaneously.

Airlines, manufacturers and banks have all experienced the shock of inventing a new technology application, investing in it and even reorienting the company to accommodate it, only to find that the technology has been copied by competitors who assimilate it much more quickly and cheaply without the growing pains.

The value gained from competitive advantage systems is temporary at best for the inventor company. The ultimate beneficiary may be the industry, or once again, probably the customer, who gains greater control of travel, purchasing or banking transactions.

So now you know. You're not creating value for your company. It's going out the door or across the network to the customer, partner or competitor.

Don't let this realization throw you, though. After all, everyone's in the same boat. Applying technology this way is the cost of staying in business.

What's more, recognizing and understanding this reality can help you. The next time your CEO, CFO, COO or the marketing VP down the hall asks you if they are getting their money's worth from IS, you can say: "Of course not. But the customer is."

Sullivan-Trainor is *Computerworld*'s research manager.

Lots of information, but few answers

LISTEN UP! *by* Elaine Bond

I'm reminded of the remark, "I have a closet full of clothing, but nothing to wear for the occasion." Most of us are nearly smothered in written material about computing products and services, yet many of us have great difficulty trying to discover the answer to a very obvious question: Which products and services work together?

We get product-specific information from lots of vendors. We get catalogs from lots of suppliers. We hear presentations at many of the meetings and conferences we attend. But in these times, information that is product and/or single-vendor specific isn't sufficient.

We need more than just vendor-specific or product-specific information. We need information about how products from different vendors will work together.

We not only need to know about the availability and virtues of a single product or service, we need to know where that product or service fits within the context of other such offerings. Simply stated, we need to know what works with what. And the sad truth is that we often can't get that sort of information, even when all the products are from the same vendor.

Evidence that the need is real can be found in user organizations where individuals and sometimes groups are devoted to working on this interoperability puzzle.

The architectures of our computing capabilities have changed. We no longer have to be — nor do we want to be — captives of a single vendor. We want choice, but the price for choice is getting more expensive than it needs to be.

Highly skilled personnel at many different levels of an organization spend much of their valuable time doing research to discover what works with what. And even if they do find an answer, it is seldom clear-cut because there is still the question of whether one can completely believe the vendors' claims. What are the limitations? What are the hidden dependencies? What are the resource requirements?

The need for better information is real enough for something to be done about it. And as professionals in the information business, we know we can and should do something about it. We can build a database or an information system with the appropriate user interface characteristics and make it available to planners, architects, resellers, technicians and just plain users. The idea has merit. It may even have business potential.

There is now a very small group of people — members of Open User Recommended Solutions, or OURS — representing a few major vendors, users and service providers who are attempting to define the requirements for just such a facility and develop a paper mock-up. With notions of vendor cooperation, defined user requirements, well-designed user requirements and a bunch of willing people, perhaps something will come of this.

In addition to making life easier for users, resellers and service providers, this information would also help any major vendor keep its own marketing and customer service personnel up to date. It would also offer entrepreneurs a chance to gain visibility for their products. It doesn't take a lot of imagination to envision additional types of information that could be included — configuration planning information, lists of required components, ordering help, sources of assistance and so on.

For now — and back to reality — the first step is being taken. Let's wish the explorers well.

Bond is a Chase fellow and senior technology consultant at The Chase Manhattan Bank NA, where she previously served as senior vice president, corporate systems executive, for 11 years. Bond is a founder of the recently formed user advocacy group, Open User Recommended Solutions.

Commentary

Charles Babcock

Novell's long shot

Novell's acquisition of Unix System Laboratories (USL) is a bold and desperate move to protect its desktop networking turf against Microsoft's Windows NT.

In taking this step, Novell has gained some ammunition to counter the NT threat. On paper, it has obtained Destiny, a desktop Unix operating system, along with ownership of server-level Unix to work with its already established NetWare LAN operating system. What this adds up to is a chance to step into the breach if Windows NT falters.

From the start, Novell has been willing to work with other vendors and has positioned itself as the integration-minded supplier of an existing network. With these components, Novell can tell the marketplace that it is in a strong position to integrate the key technologies that desktop users need to continue growing: an industry-standard operating system and a network operating system that has become a de facto standard.

Microsoft owns an industry standard in MS-DOS and is still working at establishing Windows as the follow-up standard. But its roots are more clearly in the stand-alone desktop. Microsoft is more used to other vendors integrating their technology with its products than it is working with other vendors to integrate their technology.

Thus a sort of open systems mantle is still up for grabs at the desktop level, and Novell is trying it on for size. But this is putting the best face on Novell's USL acquisition.

Saying this deal has the technical potential to counter Windows NT is very different from predicting that it will do so.

There are a number of obstacles, including the following:

- **Timing.** Commenting on the deal, Novell Chairman Ray Noorda said, "The time is right to unify Unix." He is correct in that the threat of NT probably makes it politically possible to bring together Solaris, AIX, SCO Open Desktop and other factions of Unix. But the right time to do this was five years ago, before Windows NT was a gleam in the Gatesian eye.

- **The transition problem.** PC users are hungry for a more powerful operating system, but it's not clear that Unix is the answer. Thus far, users of Intel-based PCs have not warmed up to Unix, as Novell well knows as the seller of something called UnixWare. If PC users were eager to upgrade from MS-DOS to Unix, the numbers of those doing so would be visible to the naked eye — and they are not.

- **Credibility.** Who is more credible as an operating system vendor? Novell spokesmen would ask, "Do you want to buy your networking from an operating system company?" Unfortunately, the question can be reversed.

Waiting in the wings

A product as complicated as Windows NT is likely to need some fixing as it comes out the door, and it remains possible that it will get off to a slow start. Even so, Novell and Destiny are unlikely to find an opening.

For years, PC and Unix users have represented two distinct communities, regardless of the technical merits of Unix. MS-DOS may be unsophisticated and rudimentary, but it continues to serve many people's needs while more sophisticated alternatives such as OS/2 and Unix win converts slowly.

There are no technical barriers to Unix becoming an excellent, Windows-driven desktop operating system. But PC users, reasonably or not, are simply looking elsewhere for leadership.

Whether Microsoft is worthy of the hopes invested in it remains to be seen. But in the meantime, NT is a much more likely recipient of those hopes than Novell's Unix.

Babcock is *Computerworld*'s technical editor.

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DIGITAL UPDATE
The Open Advantage

January 1993

PUZZLED BY COMPUTER DOWNSIZING?

Look to Digital Solutions to Bring All the Pieces Together

By Rich Whitman, Marketing Director
Computer Downsizing and Reengineering

Computer engineering downsizing — a fad? The terminology itself may be fleeting, but the idea behind it is here to stay. With the continuing advances in desktop technology in terms of price and performance, and with the increasing acceptance of standards-based operating systems and software environments, computer downsizing is almost an inevitable conclusion — especially for any business that wants to significantly cut costs, increase productivity, and improve its quality of service. And what business doesn't want to accomplish all three?

For all these reasons, a majority of computing industry analysts believe that downsizing represents a major paradigm shift in the way computing will be delivered in the future. And, if such is the wave of the future, a clear definition of "computer downsizing" is the first order of business.

The Meaning of Computer Downsizing

At Digital, we don't believe that businesses can or even want to "throw out" their mainframes. Rather, they want to solve their business problems using new technology — technology that will better utilize these legacy systems.

Therefore, we define computer downsizing as a movement to less-expensive computing platforms or environments. A movement that, to be successful, must:

- Address the business issues of cost, productivity, and quality.
- Enable the exploitation of new technologies such as open standards, client/server computing, and distributed network systems.
- Allow your business to leverage its existing technology investments.
- Speak to "people" issues through consulting, training, and open business practices.

Digital's computer downsizing solutions are unique in the industry in that they offer you not just one of the pieces to the downsizing puzzle — but all of them.

Three Ways to Computer Downsize

Today, businesses are computer downsizing in one of three ways: rehosting, rearchitecting, or reengineering. The selection of one over the other is based entirely on your specific needs. Do you want to move your applications to a different platform? Or, do you need to reengineer your core business processes? Do you need to cut costs as quickly as possible? Or, are you looking for value over the long term?

Rehosting

Both technology- and cost-driven, rehosting is the easiest method of computer downsizing. You're moving applications to more cost-effective hardware platforms. The application environment and core business processes are fundamentally unaffected.

Rearchitecting

Rearchitecting means changing your applications to take advantage of new hardware and software technologies. It may be as simple as implementing a graphical user interface (GUI), or you could rewrite the entire application to take advantage of client/server technology.

Reengineering

Perhaps you need to fundamentally change your core business processes. The decision to reengineer your business processes and redesign your applications takes more time and may involve the help of outside parties, such as systems integrators. Yet, it offers you more value over the long term.

Who Should Think About Computer Downsizing?

Computer downsizing embraces all the information systems in your organization — from the data center to the desktop. It is a style of computing that revolves around smaller platforms such as the midrange, workstations, PCs, LANs, hardware, software, and networking standards. The major benefits?

- Faster application development through the use of new, high-level languages, automated tools, and application programming interfaces.
- Greater ease-of-use and productivity through the use of a GUI.
- Greater flexibility and improved performance through the use of client/server architecture.
- Hardware and software portability and interoperability resulting from the standards-based open environment.
- Lower costs resulting from the ability to shop the competitive market — mixing and matching hardware and software from multiple vendors.

This is all well and good — but you may still be asking the question: Is downsizing the right direction for my business?

Take a look at the following scenarios. If you recognize your business in one of them, computer downsizing will most likely garner you significant cost and productivity benefits.

> **Digital has an unmatched understanding of the business, people, and technology issues involved in computer engineering downsizing. And, we have a clear strategy for helping companies plan, implement, and manage a downsized, open, multivendor computing environment.**

Do You Utilize Applications That Run on Both IBM and VAX Systems?

If you do, downsizing can save you money quickly — with no change of code, no user retraining, and no operator training. Perhaps you're running SAS, or a general ledger application like Dun & Bradstreet's Millennium. Moving these kinds of applications to a more cost-effective platform can save you one-third to one-half of what it takes to run them on your mainframe — and you're still able to maintain the same performance.

Are You Stuck Running an Obsolete Operating System?

Perhaps you're running MVS/SP, VSE/SP, or even MVS/XA. If so, you're computing equipment has you trapped. You have no support, no upgrade path, no alternative — unless you consider computer downsizing.

Are Older Model IBM Systems Running Your Business?

If you're using 3090, 308x, or 43xx model systems, you know just how expensive it is to run your applications. Today, the cost of software licenses as well as applications are high and will only increase in cost in the future. Plus, your need for greater CPU capacity continues to grow. You have two choices. Spend money on a CPU upgrade or off-load larger applications to a smaller, more powerful system. Ultimately, your decision to computer downsize enables you to lower costs and better serve your user community.

Are You Considering the Advantages of UNIX?

You have no intention of getting rid of your mainframe. You still rely on it to run some of your critical business applications. However, you do want to add new applications using UNIX and/or client/server computing. This style of computing is open and distributed, integrates all of your PC users, and offers rapid application development.

Each of these business scenarios would benefit from computer downsizing. By utilizing Digital's computer downsizing solutions — a variety of hardware, software, and comprehensive consulting services — your organization can achieve significant benefits without abandoning your investment in existing systems.

Take Advantage of Our Experience

In one sense, Digital pioneered the computer downsizing movement. From early on in our history, we've moved information from the mainframe to minicomputers — and we've been helping other organizations take advantage of our experience in distributed computing ever since.

continued ►

continued

But we haven't stopped there. We recognize technology as an enabler to bridge old systems to a style of flexible, distributed, integrated, standards-based computing. This new computing style is characterized by smaller systems, open systems, client/server architecture, faster application delivery, and lower costs. It embraces all the information systems in the organization, from the data center to the desktop.

We understand how you want to run your business. You want to reduce the cost of information technology. And you want to use state-of-the-art technology to drive your business more effectively. Digital's computer downsizing solutions lower the downsizing risk while improving your bottom line.

All the Right Pieces

At the outset and all the way through the computer downsizing process, our comprehensive consulting services and technical training programs will help you analyze, design, architect, and reengineer your information systems infrastructure — and perhaps your core business practices, as well.

In terms of hardware, we offer the openness and the power of VAX OpenVMS systems. What's more, our Alpha AXP family of open midrange, server, and desktop systems provides processing power that rivals the mainframe — at a fraction of the cost.

In the area of networking, we've taken the lead in supporting the full range of both industry-wide and proprietary networking and telecommunications standards. Plus, our Network Application Support (NAS) family of products and services, including PATHWORKS and DEC ACCESSWORKS, provides communications and application integration and interoperability across local and wide area networks.

To prevent computing chaos, a distributed computing environment needs to be effectively managed. Digital's POLYCENTER solution puts you in control by providing integrated management of the network, systems, storage, and application, including software distribution, system backup, and more.

Computer Downsizing Solutions That Are Truly 'Open'

We can make a statement that very few vendors — if any — can make: Whatever the operating system, database system, network, or desktop systems you currently have installed in your computing environment, Digital's computer downsizing solutions can tie them all together. We can complete your computer downsizing picture and make it work better than anyone else in the business.

For more information on Digital's computer downsizing solutions, call 800-332-8228.

For Success in DOWNSIZING, Scott Paper Uses the Team Approach: Digital and Unidata

IN the late 1980s, Scott Paper — the world's leading supplier of tissue paper products — decided to downsize operations. In fact, company management issued a downsizing directive to every division of its organization, including MIS.

Since the actual downsizing process was left to division managers, MIS at Scott's Everett, Washington mill focused on improving its computing system as a way to help the Philadelphia-based company cut costs.

With a critical mission at hand, Scott Paper turned to Digital and Unidata for assistance.

The Problem

Operations at the Everett mill were dependent on a multi-system environment — one database system to manage the business applications, and various other computers from different vendors to manage all aspects of production and manufacturing. As a result, MIS had to maintain diverse computing environments, and users had to learn to use several computing systems.

The mill needed a single vendor to provide systems for both business applications and shop floor production. After a thorough evaluation, Scott Paper chose Digital to provide a uniform, integrated computing environment via a VAXcluster system.

Power, Flexibility, and Openness

The Digital hardware implemented at Scott Paper included two VAX 6000 Model 410 systems and three VAX 3000 systems. The VAX 6000 — chosen for its industry-leading technology, price/performance, and flexible upgrade path — also provides Scott Paper with:

- A powerful CPU
- Expanded memory and storage capacity
- High-speed networking capabilities.

In addition, the clustering feature of OpenVMS has given the paper manufacturer an efficient, economical way to share data resources.

Unidata Serves as Critical Link

Once Scott decided to standardize using Digital hardware, one challenge remained: how to continue using its older non-Digital database system in the new OpenVMS environment. Careful research led the company to Unidata, a Digital independent software vendor headquartered in Denver, and Creative Computing Solutions (CCS), a Unidata value-added reseller based in Fremont, California.

By moving to the OpenVMS environment, Scott Paper has maintained its original database system and reduced its IS costs by 20 percent — a significant contribution to the company's overall downsizing efforts.

Unidata provides small, medium, and Fortune 1000 companies with a relational database management system (RDBMS) that supports relations and multidimensional arrays. Unidata's RDBMS operates under OpenVMS and UNIX, is compatible with Scott Paper's previous computing environment, and has enabled Scott Paper to run its main business applications with improved response time.

Plus, Unidata's compatibility with Scott Paper's previous database system allowed this system to be converted to OpenVMS — while retaining the same look and feel for users.

After six weeks of duplicating, testing, and tuning 100 programs and 20 files, CCS converted Scott Paper's old database system to Unidata software and then ported it to the OpenVMS environment. "The conversion went fairly smoothly without any major upsets," stated Wendell Harris, IS Manager, Scott Paper. "And we met all project timelines."

The major benefits resulting from Scott Paper's decision to team Digital and Unidata include investment protection, no downtime, no retraining — and, most important, no hassle.

For information on Digital/Unidata solutions, call Terry Truman, Unidata's Director of Channel Marketing, at 303-294-0800.

NEWS FLASH

Digital Distributors Offer Speedy Delivery of EF5x Solid State Disks

A call to one of Digital's authorized distributors provides speedy delivery of lightning-fast EF5x Solid State Disks. Starting at $19,000, these solid state disks cost-effectively plug-and-play into business-critical, distributed, and server applications running on DSSI-based systems.

Available models include the 107 MB EF51R and the 205 MB EF52R — each offering an integrated Data Retention System that ensures secure data storage if power is lost.

For information or to order, call one of the following authorized Digital distributors:

Avnet Computer	**800-426-7999**
IOCS	**800-451-1033**
MTI Systems/Arrow	**800-645-6530**
Pioneer Standard	**800-874-6633**
Total Tec Systems	**908-906-6500**
Trilogic Corporation	**800-346-2933**
Wyle Laboratories	**800-332-6995**

DECpc 320P Notebook Upgrades: Fast and Affordable

Digital offers a variety of upgrade services for your DECpc 320P Notebook — in as little as two days. Services include:

- Free virus detection and eradication
- Comprehensive diagnostics
- Installation and testing of up to four DECpc 320P options in one notebook for one upgrade charge.

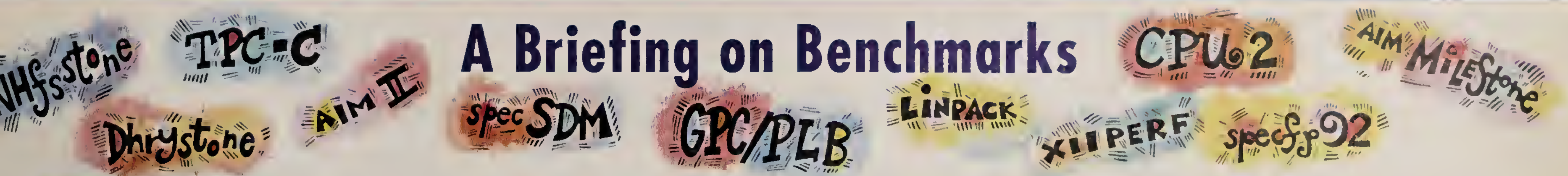
Option	Price
80 MB IDE Hard Disk Drive	$400
FAX Internal Madem (2400 baud Data/9600 baud)	$24B
Intel 80387sx/20 MHz Math Coprocessor*	$160
2 MB Chipcard/70 ns*	$150
(4 MB)	$300
(6 MB)	$450
Upgrade service charge per unit	$135

** User- or factory-installable*

Two of these upgrade options provide free benefits. With your purchase of an 80 MB IDE hard disk drive, we will transfer data and perform a hard drive operability check. With your purchase of a Data/FAX Modem upgrade, Digital will install and test FAXit for Windows software.

For more information on Digital's DECpc 320P Notebook upgrades, call a DESKTOP DIRECT Technical Service representative at 800-722-9332.

A Briefing on Benchmarks



You're planning to purchase a new workstation and you need some vital information to help you make the right choice. You need to find out whether System X can handle your particular application well enough to satisfy your business requirements, and whether it's a better value than System Y. Ideally, this information would come from a direct comparison of the competing systems running your application under exactly the same conditions — a situation that's costly and not likely to occur.

When you can't do side-by-side comparisons of actual applications, the next best information provider is the benchmark. Benchmarks measure everything from CPU to memory to I/O subsystems, and more. That's why it's up to you to choose the particular benchmarks that relate directly to your system's applications. Choosing the wrong benchmarks can be a waste of time and money. You may be misled into selecting a system that cannot do the job according to your requirements.

Major Benchmarks: What They Measure

Of the major industry-standard benchmarks, the following are likely to be your best sources of information prior to a system purchase. Most vendors will provide you with specific results of these on their own platforms.

SPECint92 and SPECfp92 (System Performance Evaluation Cooperative)

Having replaced the original SPECmark, these measure processor speed, memory bandwidth, and compiler effectiveness. SPECint92 is a set of 6 Integer C programs. SPECfp92 is a set of 9 dp floating-point FORTRAN, 3 sp floating-point FORTRAN, and 2 sp C programs.

SPECrate_fp92 and SPECrate_int92 (System Performance Evaluation Cooperative)

These benchmarks are capacity metrica. Instead of measuring "how fast" a system can perform any task, these SPECrate benchmarks measure how many tasks a system completes within an arbitrary time interval. SPECrate_int92 and SPECrate_fp92 use the same set of tests in the SPECint92 and SPECfp92 suites. However, one or more concurrent invocations of each benchmark in the suite are run to determine the maximum throughput a system can produce for a given benchmark. Ultimately, the SPECrate benchmarks provide the capability of comparing uniprocessors and multiprocessors.

AIM II

This benchmark measures integer and floating point, I/O transfers, O/S function and system calls, disk access, and data transfer over a UNIX pipe.

AIM III

Measuring CPU, floating point, I/O, memory, integer, and some system functions, AIM III can be used to compare relative performance of multiuser UNIX systems, and can be customized for capacity planning. (Metrica: AIM Performance Rating, Maximum User Loads)

> **Choosing a new workstation can be difficult. There are so many on the market these days. What you need is a brief lesson on benchmarks to help you make better, more informed system purchasing decisions.**

AIM Milestone

AIM Milestone is functionally representative of real user loads in a multiuser environment. It measures system utilities' speed and capacity for UNIX systems. (Metric: Utilities Index)

SPEC SDM

Measuring CPU, memory, compiler effectiveness, and I/O subsystems, SPEC SDM is representative of a UNIX software development multitasking environment. It also has a multi-stream metric for multiprocessor systems. (Metric: Peak Throughput in scripts/hour)

TPC-A

This benchmark measures CPU, memory, I/O subsystems, terminal handling, and database performance. TPC-A is an online transaction processing benchmark and is database dependent. Some vendors use client/server or front-end/back-end configurations. (Metrica: TPS-A, $K/TPS-A)

TPC-B

Measuring CPU, memory, and I/O subsystem and database performance, TPC-B should be used to compare relative performance of database managers. It does not, however, contain representative user interaction via terminal handling or think time. (Metrica: TPS-B, $K/TPS-B)

TPC-C

An online order-entry benchmark that is database dependent, TPC-C measures CPU, memory, I/O subsystems, terminal handling, database performance, and forms processing. This benchmark offers a transaction profile that is more realistic and more complex than TPC-A or TPC-B. (Metrica: TPM-C, $K/TPM-C)

Dhrystone

Dhrystone measures integer processor and C, Ada, or Turbo Pascal compiler efficiency. (Metric: Integer MIPS)

Linpack

This benchmark measures single- and double-precision floating point using FORTRAN, and is representative of mathematical and scientific applications. (Metrica: Sp MFLOPS, Dp MFLOPS)

CPU2

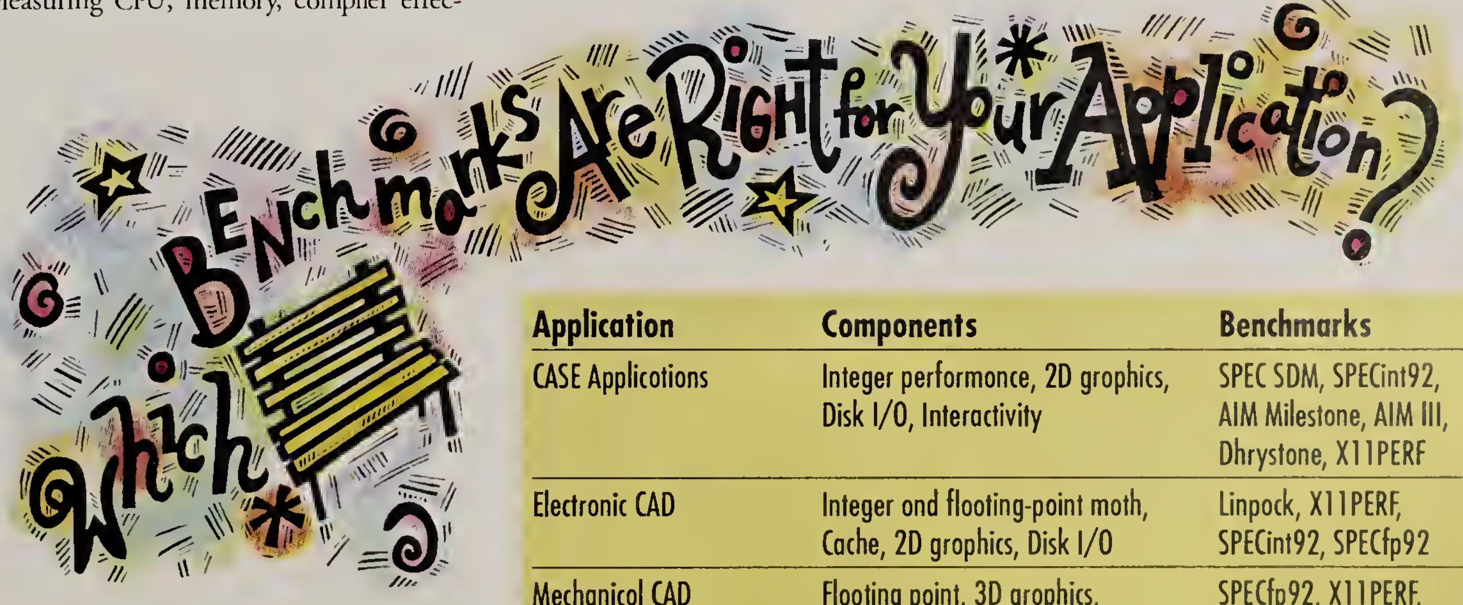
CPU2 measures CPU, memory, integer, and single-precision floating point. This benchmark is FORTRAN and fp intensive. (Metric: MVUPS)

X11PERF and GPC/PLB (For Workstation Graphics)

X11PERF tests aspects of X server performance from simple 2D vectors to complex 3D polygons. GPC/PLB is a set of picture-level benchmarks designed to measure relative performance of CRT-based displays.

NHfsstone

Measuring NFS server performance, NHfsstone is one of the very few network environment benchmarks in existence. It measures average response time for NFS transfers as the load on the server is increased.


Which Benchmarks Are Right for Your Application?

To find out, establish which components are used in your application. Then, choose the benchmark that measures that component. Or, use this chart — listing specific applications, their components, and appropriate benchmarks — to help you decide.

Application	Components	Benchmarks
CASE Applications	Integer performance, 2D graphics, Disk I/O, Interactivity	SPEC SDM, SPECint92, AIM Milestone, AIM III, Dhrystone, X11PERF
Electronic CAD	Integer and floating-point math, Cache, 2D graphics, Disk I/O	Linpack, X11PERF, SPECint92, SPECfp92
Mechanical CAD	Floating point, 3D graphics, Memory, Disk I/O	SPECfp92, X11PERF, GPC/PLB, Linpack, CPU2
Database Applications	I/O, Database performance	TPC-A, TPC-B, AIM, TPC-C
Multipurpose Servers	Multitasking, Multiuser, I/O, CPU, Memory, Network interface	AIM III, SPEC SDM, NHfsstone, AIM Milestone
Scientific Applications	CPU, Floating point, Integer	SPECint92, SPECfp92, Dhrystone, Linpack, CPU2
Multiprocessor Systems	Capacity	SPECrate_int92, SPECrate_fp92

Choosing the Ideal Lessor: We'll Help You Count the Ways

You've decided that leasing is the best method of acquiring computing equipment. Now you have to decide on a lessor. Should you base your decision solely on who has the lowest lease rate? Or, should you consider a combination of critical factors?

Because of the need to work so closely together, you and your lessor become "partners" in a sense. That's why your choice of lessor should go beyond merely finding the company who has the lowest lease rate. We offer 11 key characteristics to consider when choosing the "best" lessor to meet your business needs.

1. Level of Experience

The greater the lessor's experience, the greater their overall market perspective — a perspective that translates into benefits for you. Your lease company should have experience in several areas, including finance, accounting, legal issues, the computer equipment market, and taxation.

2. Knowledge of Computer Equipment

A lessor's computer knowledge can be tapped when you're choosing the system that best meets your needs.

3. Administrative Support

Efficiency in documentation, invoicing, sales/use/property tax collection and remittance, asset tracking, and end-of-lease notification and negotiations is critical to a successful leasing relationship.

4. Firmness of Commitment

A firm commitment to a rate, for a specified time period, protects you against upward revisions once the competition has been eliminated.

5. Flexibility

Your lessor should be willing to creatively meet your equipment needs.

6. Speed of Transaction Completion

When you need computer equipment, you usually need it quickly.

7. Ability to Offer Upgrades, Takeouts, Rollovers

The "best" lessor will not only give you adequate options to meet future needs, but also provide the financing alternatives to implement those options.

8. Financial Strength

In the best interests of your company's future, make sure your lessor will be around long enough to see it.

9. Lease Rate

One piece of advice. If a lease rate seems too good to be true, it probably is.

10. Full Range of Finance Products

Choose a lessor that can continue to satisfy your many different lease product requirements.

11. Reasonable Documentation

Your leasing documentation should be reasonable, flexible, and, most important, it should protect the interests of both parties.

Digital's leasing programs offer you all these features and more. For information, call 800-343-3451, or 800-322-3239 inside Massachusetts, and we'll put you in touch with one of our leasing experts.

DEClaser 1152 PostScript Level 2 printer

DEClaser 1152 PostScript Level 2 Printer Available for Under $1,000

The DEClaser 1152 printer — Digital's newest desktop PostScript printer — provides the highest-quality printing at the lowest possible price. And now, your local Digital authorized distributor is offering this powerful printer at only $999 after factory rebate. The DEClaser 1152 printer comes equipped with:

- Support for PostScript Level 2 and HP PCL 4
- Serial, parallel, and AppleTalk connections — allowing a single printer to serve three hosts simultaneously
- 17 resident PostScript fonts (upgradable to 43 fonts)
- 2 MB of standard memory (upgradable to 4 MB).

Plus, this 4-page-per-minute desktop laser printer includes a new, faster controller, autoport sensing, and the industry-leading Canon LBP-LX engine.

To take advantage of this $999 factory rebate offer on the DEClaser 1152 PostScript Level 2 printer, call 800-DEC-INFO (800-332-4636) and reference ext. 844.

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Desktop Computing

Commerce Department's new bulletin board, 40
Orlando electronically enables volunteerism, 42

Humor

Paul Gillin

Easy as 1-OS/2-3

Today I'm going to tell you how to install and use the OS/2 operating system. Actually, I won't tell you much about using it because I've never really been able to get past installing it myself.

OS/2 is a powerful multitasking, multithreaded, multigrain, multicultural operating system (the "traffic cop" that tells a computer when to crash). Users who have worked with DOS for a long time will love OS/2 because it frees them from the chore of choosing which applications to use. That is because there *are* no applications for OS/2, or at least none that I've been able to find. If anyone has an OS/2 application, please send it to me because I've never seen one and have only heard about them from stories my grandfather used to tell.

The first thing you will notice when you install OS/2 is that it comes on 20 convenient floppy disks. But don't be frightened by that number because chances are you won't have to use more than 17 of them. Open your manual to the installation section and read it carefully. Become very familiar with it. Sleep with it. You are going to have to use it again and again and again.

That is because for the average user, OS/2 is about as intuitive to install as a gyroscopic navigation system on a Boeing 757. In fact, OS/2 support professionals frequently spend three or four months as Boeing 757 mechanics in order to "ease into" OS/2 support.

I recommend using OS/2's "dual boot" option, which allows you to "boot" either "DOS" or "OS/2" at start-up. The dual boot requires "repartitioning" your hard disk, resulting in "total loss" of all "data" on it. Remember that you read it here because OS/2 doesn't tell you about this until it's almost too late and you're one keystroke

Gillin, *page 44*

Portables theft rises

By James Daly

Better keep a sharp eye on your laptop. Last year, the theft of portable computers quadrupled over 1991 levels, according to a nationwide clearinghouse of security information.

"We're talking about hundreds and hundreds of thousands of computers being stolen," said Robert Zises, a spokesman for the New York-based Stolen Computer Registry.

The latest culprits in the thievery game are employees who walk off with unsecured laptop and notebook-size machines. "The level of internal theft has been incredible; that's where we're seeing the most growth," said Zises, who also serves as president of Nacomex, the National Computer Exchange, Inc. in New York.

But thieves do not appear only from within, Zises warned. The incredible miniaturization and proliferation of portable computers in the past few years has wreaked havoc on the minds of many information systems managers who must equip traveling employees. With 120M-byte hard disks running upwards of 25 MHz on 5-pound laptops, portables are a frequent repository for mission-critical tasks and can often carry sensitive inside data.

Because they allow field access to central computers, they are also a perfect way to steal information from a corporate database. Thieves take laptops not only to get at the data stored in the disk drive but also to dial into company mainframes.

Laptop theft has already affected national figures such as Compaq Computer Corp. Chairman Ben Rosen.

"Laptops and notebook computers are God's gift to thieves," said Fuller O'Connor, president of computer security firm IDX Technologies, Inc. and head of International Computer Recovery Center (ICRC), a centralized data bank for the identification of stolen or lost computers based in Setauket, N.Y. "They're portable, powerful and very easily stolen."

Battening the hatches

Security experts suggested a number of ways to secure vulnerable portable computers: using physical tie-down devices that bolt a machine to a table or cabinet; enforcing rigid sign-out methods for portable computer use; and encrypting data so that if a portable is stolen, the information on it will be useless.

Both the Stolen Computer Registry and ICRC assist recovery by maintaining a database containing the serial numbers, makes, models and configurations of stolen computers.

The information is made available to sales channels and law enforcement authorities, among others, in an effort to intercept the sale of stolen gear and return it to the rightful owner.

Many users of portable computers are unaware of their vulnerability. In a recent survey by International Data Corp., only 1% of the respondents said they perceive security as a limitation of portable computers.

Cancer society battling disease with technology

By Michael Fitzgerald
AUSTIN, TEXAS

Take one package of IBM's OS/2 and a healthy dose of the Micro Channel Architecture (MCA) to cure cancer? Sounds unlikely, but the information systems group at the American Cancer Society (ACS) data center is serious about its role in the battle against the disease.

"We're part of the team here, and our ultimate goal is to end cancer," said Jerald S. Noble, director of telecommunications and PC support at the ACS. "That is our mission."

To achieve this through IS, about two years ago the ACS began moving its field offices to a client/server environment that operated under OS/2. The project, called Maxx, moved donor, volunteer and crusade information from an IBM mainframe to a client/server environment run over OS/2 servers connected via a wide-area network. Currently, ACS has 59 sites installed, including 19 of its 57 division offices.

The entire operation runs off of OS/2 1.3 Extended Edition. In a unique twist, the ACS handles the communications through OS/2's built-in communications manager and Advanced Peer-to-Peer Communications (APPC), and the database function built into OS/2 acts as the database manager.

"Because everything we do [in a distributed environment] is tightly coupled around OS/2, we want to keep things tight because it's an environment that gets extremely complicated to manage," said Kyle Cooper, senior technical analyst at the ACS.

Information still gets fed into an IBM DB2 database on the mainframe, where a mirror image of the current database is kept. However, because the database runs off a server, queries can now be handled much more quickly and without downloading from the mainframe, Noble said.

Besides gaining more flexible data transfers, Noble said, using the hooks built into OS/2 for communications and data management saved the ACS "a tremendous amount of money."

The ACS does maintain a number of Novell, Inc. networks for a variety of other purposes. In its field offices, local users run software from WordPerfect Corp., Lotus Development Corp. and DataEase, Inc.

Its choice of hardware was MCA-

Cancer society, *page 42*

ON SITE

American Cancer Society
Austin, Texas

Challenge: To move to a distributed environment, better manage growth and increase flexibility.

Technology: The communications and database manager extensions for OS/2, a satellite-based WAN and MCA-based hardware.

Status: More than one-third of the way throughthe rollout of a successful implementation of client/server-based network with true distributed data management.

Board offers free access to U.S. data

By Gary H. Anthes
WASHINGTON, D.C

The U.S. Department of Commerce has established the mother of all computer bulletin boards — an electronic octopus offering access to data, software and people at more than 50 federal agencies. These include the Library of Congress, the Government Printing Office, the Internal Revenue Service, the National Science Foundation, the National Institute of Standards and Technology (NIST) and the U.S. departments of Defense, Agriculture, Justice, Labor, Treasury, Energy and Commerce.

Using a publicly available telephone number, users can dial into the National Technical Information Service's FedWorld and at no charge pass through a gateway to any of 61 government bulletin boards, and that number is growing. In addition, users can exchange electronic mail with other global FedWorld users or with specialized constituencies on the individual boards. They can even hold live teleconferences with other users.

In a few minutes — for at most the cost of a long-distance telephone call — a user can hopscotch around a virtual Washington, D.C., downloading consumer information from the Agriculture Department, information from the Export-Import Bank of the U.S., economic data from the Commerce Department, news of the latest computer viruses from NIST and high-resolution images from weather satellites.

Users can also see who else is making a similar journey by entering the "Who" command and can fire off a message to the FedWorld "Sysop" if any problems are encountered.

In addition to serving as a gateway to other government bulletin boards, FedWorld offers access to files maintained by the National Technical Information Service, a unit of the Commerce Department whose mission is the collection and dissemination of technical information produced by the U.S. government.

Popular requests

The most common requests pertain to information about the Computer-aided Acquisition and Logistics Support program of the Defense and Commerce departments. Files can be read on-line, downloaded or searched by entering key words or program names.

At the heart of FedWorld is an Intel Corp. I486 PC running at 50 MHz with four multiplexers attached. Software is a standard, off-the-shelf bulletin board package, said Thomas Walker, FedWorld project director.

Walker said FedWorld was set up in part to satisfy a mandate from Congress to demonstrate the feasibility of a public gateway to government data.

"It's obvious gateways exist; we wanted to do it at a reasonable cost," he said, adding that the gateway was set up in 78 days for less than $20,000.

Walker said it is possible but not likely that a toll-free number will be obtained for FedWorld. However, to make it more accessible to the public, he said FedWorld may be offered as an option on one or more commercial networks or may be connected to Internet, the quasi-public network partly funded by the federal government.

FedWorld can be accessed at up to 9.6K bit/sec. by dialing (703) 321-8020. Set parity to NONE, data bits to 8 and stop bit to 1. Terminal emulation should be set to ANSI or to VT100.

Few hitches or glitches

A *Computerworld* reporter tried FedWorld and found it easy to use and nearly glitch-free.

He bypassed an option to download 100,000 bytes of user documentation but found the service's prompts and menus were so clear that no documentation was needed to do most things.

Response time was nearly instantaneous, but use of the "Who" command showed just three other users logged on at the time.

Only one request went awry. An attempt to download satellite images of Hurricane Andrew failed with no explanation.

It turned out that the user must first download special software to receive satellite images.

Scanning a table of registered users, the reporter found a potpourri of people including a "soon to be retired military physicist," someone from IBM Federal Systems Co., a "computer-literate logistics engineer," an "Oracle, Sybase RDBMS consultant," a C and Clipper programmerand an "experienced government information policy consultant."

Iomega adds to removable storage line

Introduces new drives for Macintosh and IBM PCs

By Michael Vizard
ROY, UTAH

With the widespread arrival of powerful, low-cost PCs capable of manipulating gigabytes of data, some users have begun to find that traditional removable devices such as floppy disks are no longer up to the task.

Looking to provide PC users with a high-capacity alternative medium for removable storage, Iomega Corp. has unveiled two offerings for the Apple Computer, Inc. Macintosh that provide 21M bytes and 150M bytes of removable storage, respectively. The company has also moved to give PC users a 250M-byte, ¼-inch tape drive aimed primarily at IBM and compatible, portable PCs that attach directly to the parallel printer port.

Leading Iomega's push into the Macintosh space is a 21M-byte, 3½-in. Floptical drive that is being touted as a replacement for the standard floppy disk drive.

"In today's PCs, main memory can be as much as 16M bytes, which is a lot more than you put on a 1.44M-byte floppy disk drive. With our 21M-byte Floptical technology we're trying to get the ratios between main memory and flexible media back in sync," said Jim Jonez, product manager for Iomega's Floptical line.

According to Jonez, Floptical drives are flexible media that make use of laser Holographic Optical Tracking Technology combined with a digital servo actuator. The actuator helps make this implementation of Iomega's Floptical drives 15% faster than Iomega's previous generation of drives for IBM PCs. Included with the drive, which has a suggested retail price of $399, is a 21M-byte disk, System 7 drivers, Small Computer Systems Interface (SCSI) cable and manuals.

Also aimed at the Macintosh market is a 150M-byte implementation of an Iomega Bernoulli drive, which Jonez said offers the lowest cost per megabyte for a Bernoulli drive available today. Priced at $799, the Bernoulli Multidisk 150 MacTransportable comes with the drive, SCSI cable, Macintosh driver software, utilities and a 150M-byte disk.

Sizable storage

The Bernoulli drives were designed to give users access to large amounts of external storage, rather than requiring them to purchase a hard disk upgrade when they run out of disk space. "Bernoulli drives are a good place to store infrequently accessed applications," Jonez said.

The 150M-byte drive can also read and write to 35M-, 65M- and 105M-byte media.

Meanwhile, in the IBM PC market, Iomega has unveiled a tape drive aimed primarily at notebook and laptop computer systems that need to store data off-line. Designed to plug into a parallel port, the Tape250 family of QIC-80 drives provide 120M bytes of storage, which can be expanded to up to 250M bytes using data compression software.

The tape drive was designed to give users a backup storage device that does not require them to have specific interface and controller cards for the bus on their PCs. The suggested retail price of the Tape250 is $548.

Battery life

Symantec unveils PowerBook utilities

By James Daly
CUPERTINO, CALIF.

Has the limited battery life of your Apple Computer, Inc. PowerBook portable got you down? Not to fear. Symantec Corp. has announced a utility package specifically designed to increase a laptop's precious battery life by four hours or more.

Norton Essentials for PowerBook Version 1.0 is a control panel that works by curtailing some of the popular portable's most energy-depleting functions. These include dimming the backlighting, spinning down the hard disk and disabling AppleTalk.

Constrained battery life is a frequent gripe among users of portable computers. Despite vendor promises that their machines typically offer four to six hours of battery life, the "low battery" warning is more likely to illuminate after two or three hours of use.

The application was actually unveiled this summer by After Hours Software, but it has since been purchased by Symantec. Initially, it was announced under the name of Guy's Utilities for Macintosh-PowerBook Edition, Symantec officials said.

Users customize their Norton Essentials for PowerBook application by choosing among several indicator icons that appear on a menu bar.

Features include the following:

- A Battery Saver component allows users to customize power settings based on the characteristics of the running application.
- A Backlight Dimmer feature allows users to dim backlighting after a specified length of time. The Battery Gauge offers many display options for viewing battery status, including a reading of remaining battery time.
- Instant Access for AppleTalk conserves memory and battery power by disabling AppleTalk when users disconnect from a network and automatically restarting it when reconnected to the network.

Norton Essentials for PowerBook also includes such tidbits as an instant on/off function that simplifies startup and shutdown when going through airport security. Also provided is QuickNotes, an electronic list pad that provides single-keystroke access to frequently needed information such as telephone, frequent-flyer and credit-card numbers.

Norton Essentials for PowerBook Version 1.0 is available for $129, according to Symantec officials.

The competition's new laser printers were inspired by a distinguished history.

Ours.

The IBM LaserPrinter 10, $1899.

Over a year ago, IBM® LaserPrinters by Lexmark were the first with affordable 600 x 600 dots-per-inch printing, for razor-sharp output.

We built in a high-speed PC-to-printer connection and a compact footprint long before the "leading" laser printer did.

And even their newest machines don't offer our wrinkle-free envelope printing, made-in-America desktop laser print engine, or toner cartridge that yields up to 60% more pages.

We've also lowered the list price on selected IBM LaserPrinters up to $1295. So the machines that pioneered better technology are now better values than ever.

To find your nearest Lexmark dealer, call 1 800 358-5835 (in Canada, 1 800 663-7662).

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Orlando connects with volunteers

Vendors join with computer professionals to boost community service

By Christopher Lindquist
ORLANDO, FLA

An orphanage needs some extra rooms to house its residents. The director knows there must be organizations and people willing to donate labor and effort, but how does he recruit them without expending limited time and money?

At the same time, a local business has some computers it would like to donate, but who needs them? And who will volunteer to deliver and support them?

Situations like these happen every day when those who need assistance, and those who want to give it, find they have no means of making a connection.

On the air

Initial computer training for volunteer coordinators at the Orlando Community Connection will have a high-tech twist: The first classes are slated to be broadcast on public television.

But Orlando is using technology and volunteerism to try to fix this problem.

A group of computer professionals from information systems organizations and vendor firms is working with other members of the community to create a system that will connect thousands of volunteers with needs in the Orlando area.

The system, called the Orlando Community Connection, will integrate distributed computing, voice recognition and synthesis and artificial intelligence to allow an expected 250,000 volunteers to match their skills with the requirements of 5,000 agencies at a rate of some 25,000 matches per month.

It is a project of massive scale and with tremendous potential to benefit the community, its founders said. Best of all, it has cost nearly nothing in terms of dollars because the resources, both human and material, have been donated.

First ray of light

The connection is the brainchild of Ed Schrank, vice president of Welbro Constructors, Inc. in Altamonte Springs, Fla. He came to the project as an "executive on loan" to assist with Orlando's City of Light program.

That program came into being approximately $1\frac{1}{2}$ years ago, when Orlando's then-mayor Bill Frederick asked President George Bush if Orlando could be the first "City of Light" as an extension of the president's "Thousand Points of Light" program. Bush agreed.

Shortly thereafter, Orlando established the Executive on Loan program, which allows business leaders to put their skills to work developing service programs for the community.

When Schrank became an executive on loan, he said he immediately saw the need for an infrastructure through which available resources could be matched to agency needs.

That infrastructure would be built around a database, but not just any database. This one would have to be easy for members of the community to use. "The goal was to have every citizen participate," Schrank said.

Last January, a team of volunteers from AT&T, IBM and the University of Central Florida came together to design the database. They designed a system that would allow basic PCs to be placed around the community in locations such as churches, businesses and schools. Coordinators at those workstations would then input information about volunteers, such as what skills they were offering, what time they had available and how to contact them. That information would then be transmitted to volunteer-managed database servers containing data from around the Orlando area.

Next, the information would be matched to needs in the community via an artificial intelligence program. From there, the volunteers would be contacted with information about what was needed, when and where.

Getting the goods

It looked good on paper, but how would it be implemented? Where would the hardware, software and developers come from?

The answer, of course, was volunteers.

"The process and the product are really the same," Schrank said. "Every time I've needed something, someone has stepped forward to fill the gap." Here are some examples:

- AT&T volunteered to donate hardware, programming talent and Conversance, a system that allows volunteers to be called by a synthesized voice that gives them information about volunteer opportunities and also lets them change their personal information via voice recognition.
- **Information Builders, Inc.** provided the AI system for making the matches.
- **Computer Associates International, Inc.** donated DBFast for the creation of the workstation user interface.
- **Ciber** donated a technical writer and Rich Woods, former New York Jets linebacker and Oracle programmer, to the cause.
- Local computer clubs offered to help install the volunteer workstations.

Eric Singleton, director of IS at the Orange County Property Appraisers Office, also stepped forward. Singleton, technical director for the project, said the scale of the effort and the advancement technology being used make it a great challenge and an enjoyable one. It is a "very, very innovative, cost-effective means of mass distribution of data," he said.

Who'll be next?

Organizers in Orlando hope other cities will be interested in establishing systems along the lines of the Orlando Community Connection.

In Orlando, once all the hardware and software is installed, trained volunteers will operate the workstations, which will be connected to several database servers via low-cost modems. The servers will also be maintained by volunteers.

The system was slated to be installed last month, with beta testing starting this month. It is slated to roll out in March. And in the summer, representatives from some 200 cities will come to Orlando for a conference at which the system will be demonstrated.

In fact, said Ed Schrank, the system's designer, the Atlanta Olympic Committee and the Rebuild L.A. organizations are already investigating the system for coordinating their own volunteer efforts.

The potential benefit of the Community Connection is huge, and it is technology that is making it possible. Technology, Schrank said, will allow people to view problems from atop a mountain of resources that will make the pile of needs a less daunting challenge. —*Christopher Lindquist*

Borland reprices Quattro Pro for DOS

By Christopher Lindquist

Borland International, Inc. has announced new pricing for the recently unbundled Quattro Pro for DOS.

For the past several months, Quattro Pro for DOS has been available only as a competitive upgrade and as part of the Win/DOS bundle that includes both DOS and Microsoft Corp. Windows versions of the spreadsheet.

However, the Win/DOS combination was a marketing failure that had "confused" some buyers and resellers, according to company President and Chief Executive Officer Philippe Kahn.

Under the new arrangement, Win/DOS will be phased out, and separate Windows and DOS versions will be available.

Additionally, for a limited time, resellers of the DOS version of Quattro Pro are being offered "dramatically lower" prices for the product, according to a company spokesman.

The result should be significantly lower end-user prices once the product reaches the channel, which should occur by the middle of this month.

No end date has been set for the promotion, although it will last at least 90 days, according to the Borland spokesman.

Cancer society

CONTINUED FROM PAGE 39

based IBM Personal System/2s because they seem to run distributed databases faster than AT bus. Noble said the organization used MCA over Extended Industry Standard Architecture (EISA) hardware because it already had IBM PS/2s installed and wanted to maintain a standard.

"We've tested AT-bus machines against the Micro Channel, and they work faster for small networks or conventional Novell LANs. But when you get into a true distributed database environment, our PS/2s blow them away, and the only thing I can figure is it's the Micro Channel," Noble said.

Most field offices use a Model 95 with 10M bytes of random-access memory. Larger offices may have machines with 16M bytes of RAM. Noble said the ACS is looking at the Server 295, a superserver made by Parallan Computer, Inc. and marketed by IBM, for eight of its largest sites.

Despite using OS/2, with its graphical user interface, the ACS runs largely character-based applications, and its Maxx system is entirely character-based.

"GUI's nice, but not in our day-to-day needs," Noble said. "We didn't want the training costs or the hardware costs. Most of our terminals don't use mice." The ACS, in part to protect itself from matter-of-course operating system upgrades, did not write to the Presentation Manager interface when it created its application and shielded the applications from the operating system as much as possible.

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THE IBM COLOR JETPRINTER PS: COLOR MADE BRILLIANTLY CLEAR.

Bank puts bucks on optical storage

By Thomas Hoffman

NEW YORK

Call Bankers Trust Co. a Windows shop. During the past few years, the financial services giant has replaced the bulk of its computer terminals with Microsoft Corp. Windows-ready PCs and is integrating most of its spreadsheets and other applications with Windows.

So it should come as no surprise that Bankers Trust recently decided to replace a microfiche-based archival storage system with a Windows-based software package, giving users access to historical report data with a Windows graphical user interface.

In the third quarter of 1992, the bank decided on StorFiche/2, a Windows-based software storage system from Microbank Software, Inc., also based in New York. According to Jeremy Keisman, vice president of global assets technology at Bankers Trust, the firm opted for StorFiche/2 over image-based systems because the software allows users not only to view and analyze report data but also to integrate it with existing applications. Other systems that Bankers Trust explored allowed users only to view images of archived reports.

"At the time we looked at it, StorFiche/2 was the only package with free-form text and character searches on reports. This was necessary for the kind of work we do, with multiple searches required often for dollar amounts," he said.

He added that the bank was ready to replace its microfiche and printed reports because these forms of record-keeping were expensive to maintain and space-consuming. By replacing these storage mediums with Storfiche/2, Keisman said, the bank expects to save money on the costs of producing microfiche, as well as on paper and research costs passed on to customers.

Bankers Trust plans to roll out the system to 90 users in its global assets division early this year. Eventually, StorFiche/2 will be used throughout the firm.

StorFiche/2, according to Keisman, can be integrated with other applications, which he said was a strong selling point. For example, Keisman said, the company can use StorFiche/2 to search a 200-page report for a specific dollar amount and find that figure within five seconds. That search had been considerably more time-consuming in the past using microfiche or printed reports.

Bankers Trust is using StorFiche/2 with a FileNet Corp. optical server. Historical reports are downloaded each day from an IBM 3090 Model 720 mainframe to the FileNet server, which stores reports on optical discs. The reports can be accessed through StorFiche/2 by Novell, Inc. NetWare local-area network users attached to the systems locally over an IBM Token Ring network and through wide-area network connections using Cisco Systems, Inc. routers over an Ethernet backbone.

Keisman would not elaborate on anticipated cost savings from StorFiche/2 but said he expects the system to help Bankers Trust better serve its customers. "There will be tremendous efficiencies gained. By getting answers back to questions within seconds, it will help us support our customers that much better."

Gillin

CONTINUED FROM PAGE 39

away from making data on your hard disk about as plentiful as lake trout in the Gobi desert.

Installation of OS/2 is actually pretty straightforward and only takes about 45 minutes. By the time you've done it six or seven times, you should be an old hand at it. This is where OS/2 becomes a real "value." Most operating systems are installed only once and then put away for good. Not OS/2! Keep those floppies handy because you're going to need them again.

OK, now you've got OS/2 installed. Let's get to work enhancing your productivity. To demonstrate OS/2's multitasking, put a disk in drive A, click on "format" and then press Control-Escape to jump to another task.

Notice how the drive keeps formatting even as you work on something else! You can do this all day if you want. In fact, you'll probably have to while you wait for an OS/2 application to arrive.

Once you've got OS/2 up and running, you'll probably want to migrate your existing applications (helpful hint: first check to see if the "repartitioning" left a "shred" of data on your hard drive). You will find that OS/2 does a magnificent job of running your old character mode applications, even in a window. Move those suckers over and start multitasking.

You'll also notice that OS/2 has a little more difficulty migrating your Windows applications to its Workplace Shell.

In fact, about the only part of the average Windows application that OS/2 can support is the icon. Click on the icon and open your eyes to a wonderful new world of error messages with helpful suggestions such as "Cannot find ADEXE.DLL" and "GPF at address 09872:10239487."

This is all part of OS/2's user-friendly interface and should not be confused with a really serious error message, which is preceded by a low gurgling sound and a dark black screen that advises you that "Your computer has stopped," a fact that would be obvious to the average garden slug.

In fact, about the only part of the average Windows application that OS/2 can support is the icon.

Congratulations! You have discovered why IBM offers three months of free support with each $49 copy of OS/2. The first time OS/2 crashed, I quickly called IBM support, who assigned me a "problem number." I described the sequence leading my system to hang. He listened carefully, analyzed my problem and then offered this helpful piece of advice: "Hmmm?"

This is why IBM is the envy of the corporate world.

Gillin, who is executive editor of *Computerworld*, now has OS/2 up and running and actually likes it quite a lot.

New Products

Fax

BIT Software Corp. has announced BitFax/OCR for Windows.

The product has incorporated Caere Corp.'s Anyfont optical character recognition technology. According to the company, a PC can receive a fax, store it and convert it to text. When Microsoft Corp.'s Windows is started, a "receive fax" program is automatically loaded, enabling faxes to continue to be received while a spreadsheet application or word processor is in progress.

BitFax/OCR for Windows operates with 386 IBM PC or Personal System/2 compatibles and requires 4M bytes of memory and Windows 3.0 or higher.

The product costs $199.

➤*BIT Software*
47897 Fremont Blvd.
Fremont, Calif. 94538
(510) 490-2928

Ibex Technologies, Inc. has announced FactsLine for Windows.

The product is a full-featured interactive voice/fax solution and, according to the company, is the first and only Microsoft Corp. Windows-based product of its kind.

New features include a pop-up scripting feature and a simulation feature that gives users the ability to test an application using a mouse and screen, eliminating the need for a telephone.

Additional features include dated documents that automatically become inactive; full management reporting capabilities with a database-driven report generator; on-line reconfiguration and updating of applications, fax documents and voice announcements; and a visual voice editor.

FactsLine for Windows is priced at $6,500.

➤*Ibex Technologies*
550 Main St.
Placerville, Calif. 95667
(916) 621-4342

Peripherals

Disk Technologies Corp. has announced a new version of its RoadRunner series of external portable hard drives.

The RoadRunner Express takes advantage of the Enhanced Parallel Port located in many notbook computers, which allows the product to operate at approximately the same speed as an internal hard drive.

It has an average seek time of less than 17 msec, an 8M-bit/sec. data transfer rate and up to eight hours of battery life for portable applications, the company reported. RoadRunner Express weighs less than two pounds and is available in 60M-, 80M-, 120M-, 180M- and 210M-byte capacities.

Prices start at $795.

➤*Disk Technologies*
Suite 114
925 S. Semoran Blvd.
Winter Park, Fla. 32792
(407) 671-5500

Software application packages

Follow-Up Software Co. has introduced Version 6.0 of Follow-Up.

The tool was designed for users involved in sales who need to maximize productivity and require information to be readily available. Follow-Up gives laptops or PCs the ability to store and organize notes, contact names and files and perform calculations and word processing.

New leads and other types of information can be updated and then transferred to the field whenever needed, the company reported.

The standard version of Follow-Up costs $399.95, and the network version costs $995.

➤*Follow-Up Software*
2456 Lakeside Ave.
Cleveland, Ohio 44114
(216) 589-5788

Manzanita Software Systems has released BusinessWorks Accounting Systems for Microsoft Corp.'s Windows.

Features for the accounting software include multidepartment consolidations, multicompany consolidations, network capabilities, real-time processing and a three-year budget history.

Parameter-driven reporting as well as a sample chart of accounts for 17 different types of businesses are also included in the package.

All modules are available for $295 except for the System Manager, which costs $95, and the $395 Job Cost module.

➤*Manzanita Software Systems*
Suite 230
2130 Professional Drive
Roseville, Calif. 95661
(916) 781-3880

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OS/2 Professional Magazine,
November 1992

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Computer Reseller News,
February 3, 1992

“Lexmark offers the best combination of price and performance for printers used for desktop publishing.”
Windows Magazine,
February 1992

“With the IBM LaserPrinter 6, Lexmark proudly comes into its own on the laser printer turf by paying special attention to paper handling and resolution quality. This workhorse prints on both delicate stationery and card stocks, and can deliver a jaw-dropping 600-by-600 dpi resolution.”
ComputerLand Magazine,
April 1992

“The 4079 is a watershed color printer. The list of features, low pricing, solid warranty... all combine to make this a color inkjet printer against which others will be measured.”
BIS Strategic Decisions,
October 1992

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BYTE Magazine,
July 1992

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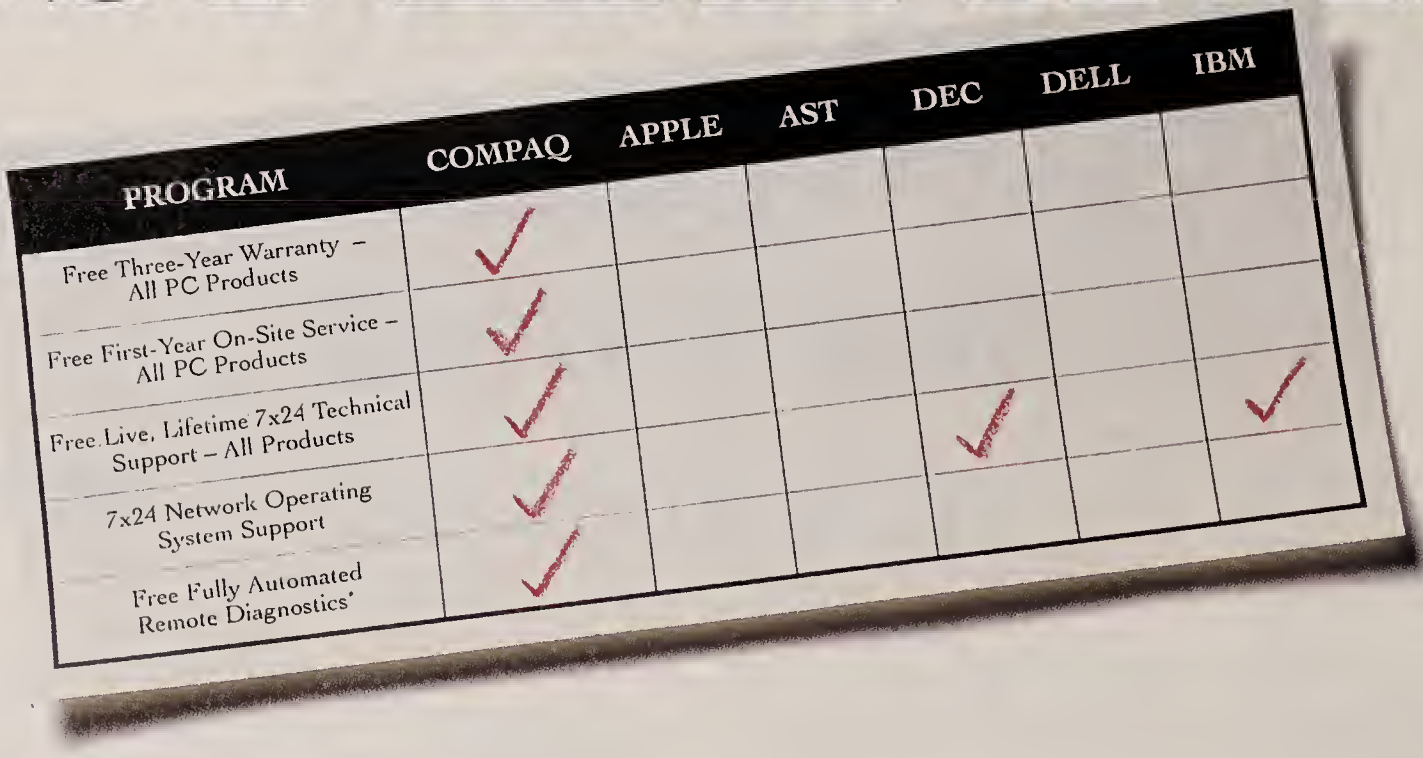

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LANs
Servers
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Workgroup Computing

Retailer boosts productivity, 48

Intel ships LANDesk Manager, 49

Commentary

David Coursey

Novell could learn from Apple

Why isn't Novell's NetWare easier to use? And, as long as I'm not making friends here, why doesn't Novell get out front in making networks significantly easier to build and administer? More specifically, if the folks in Utah are so smart, why isn't NetWare as easy to work with as AppleShare?

Yes, Big Red makes incremental changes all the time. But most are aimed at making NetWare more powerful rather than more easy, especially for part-time network administrators. And that's where the answer lies, I think.

Novell is a supporter of full employment for network administrators. That explains why even the simplest requests under NetWare — such as, "Where did you say those spreadsheets are stored?" — sometimes require an emergency call to the NetWare Gods. Adding users or setting up their machines? Not something I can do on NetWare, although it's something I do almost every day on a Macintosh network at my office.

Not a concern

Ease of use doesn't seem to matter much to Novell: While Macintosh is the computer for the rest of us, Novell has created its own secret order of Certified NetWare Engineers (CNE) and is doing everything possible not only to keep them working but to expand their ranks wherever possible. These CNEs are, in a sense, double agents inside Novell customer organizations. This is a page stolen from the *IBM Big Book of Account Control*, which not only created its own techie priesthood but managed to keep white-shirted IBMers employed at customer sites as well.

Because they are almost always NetWare-specific, CNEs have a strong interest in adding more NetWare servers. And because they often don't know anything else, it's hard to accuse them of deliberately working against their "real" — i.e., not Novell — employers' best interests.

Nevertheless, CNEs pose a threat to the advance of networked computing — at least if you're Microsoft, Apple, Banyan or anyone else with an arguably better idea. And lacking their own in-house proselytizers, other vendors are going to have a hard time breaking Novell's dominance.

Yet Novell obviously feels the warm breath of competition breathing down its neck. The company's supposed role in the Federal Trade Commission investigation of Microsoft and the

Coursey, *page 48*

System V gets a boost

A smoother road for Unix

By Maryfran Johnson and Michele Dostert

Out with Ma Bell. In with Novell.

There you have the New Year's resolution of Novell, Inc., with its proposed $350 million purchase of Unix System Laboratories, Inc. (USL) from AT&T — a simple change of ownership that is bound to have complex repercussions.

It is still too early to predict how control of the most widely used variant of Unix by an independent software company — instead of the telephone company — will shift the industry power base. But users anticipate a welcome boost in the corporate fortunes of the Unix System V operating system and Novell's NetWare.

They also see the pair positioned now to present a credible alternative to Microsoft Corp.'s Windows NT operating system when it makes its midyear debut. Indeed, without the marketing savvy and distribution channel expertise of Novell, users and analysts agreed, Unix stood little chance as a serious competitor to NT on the desktop.

"The two major Unix companies — Hewlett-Packard and Sun Microsystems — aren't interested in selling software," said Jamie Lewis, an analyst at The Burton Group, a local-area network research firm in Salt Lake City. "The channel ubiquity of DOS and Windows is enormous, and Sun, HP, SCO [The Santa Cruz Operation] and USL were not pushing Unix in the channel so it could effectively compete for the desktop."

Changing that scenario and leveraging Unix's strengths as a server-based operating system will be up to Novell, with its roughly 65% share of the PC LAN marketplace. An estimated 12 million PCs were on LANs in 1991, with a projected 28 million expected by 1995, according to Forrester Research, Inc.

Novell's proposed acquisition of the Unix System V operating system bodes well for users who need smoother integration between Unix-based servers and PC LANs.

"The Novell channel can put together NetWare/Unix systems for businesses, and that just makes Unix much more accessible," said Lorie Mauklas, project leader at Hoechst Celenase Corp. in Bridgewater, N.J., which runs NetWare for more than 1,000 users in one division. "In large NetWare/Unix sites like ours, if Novell has control over USL, we can roll stuff together in purchasing contracts and work out better pricing structures for our business."

But users will also be watching Novell's treatment of the entire range of desktop operating systems it now serves. "They'll have to be vigorous in supporting Windows NT and OS/2 and all the other client types that are out there, or they'll worry a lot of people," Mauklas said.

Even before the merger is approved by USL shareholders and various regulatory agencies, USL and Novell already have their act together in the shape of UnixWare. This scalable 32-bit operating system, which integrates Unix System V Release 4.2 with Novell NetWare, began shipping Dec. 8 from Univel, Inc., the Novell/USL joint venture company formed in late 1991.

Unix, *page 48*

NCR regroups, makes plans for Cooperation

With its OS/2 server version coming to a quick end and its Unix implementation behind schedule, NCR's Cooperation environment now faces impatient customers and a marketing challenge from inexpensive workgroup packages from the likes of Lotus and Microsoft.

By Ellis Booker

DAYTON, OHIO

With 20/20 hindsight, NCR Corp. executives recently admitted that the company probably would have been better to back Unix rather than OS/2 servers when it introduced its strategic Cooperation software platform in January 1990.

"At the time, we believed OS/2 would be one of the two winners in the server [operating system] wars," said Keith Vozel, NCR's director of network and strategic product marketing. "We now believe that is no longer the case. . . . Unix is the clear winner."

Cooperation is the software glue behind NCR's ambitious Open Cooperative Computing Architecture. An object-oriented, networked computing environment, Cooperation is billed as a platform for bringing the robustness, security and consistency typically associated with centralized, host-based systems to a distributed, client/server environment.

But early backing of OS/2 delayed the implementation of a Unix server product, which was expected in April. Meanwhile, the patience of enthusiastic early Cooperation customers was stretched to the breaking point.

"It got to the point where my rollout to additional offices looked like it would have to be with OS/2," said Raymond L. Howell, assistant vice president of information management/commercial market segment at ITT Harford in Hartford, Conn.

Howell is pleased to report, however, that he has the beta-test Unix code in hand, and he said he thinks he can bring up two "Unix style" offices in February and March.

"I'm not really discouraged with the base product . . . only with getting this port in place," Howell said.

Sensitive to this reaction, NCR issued a second release of the OS/2 server software last month and said all future enhancements to Cooperation would be under the Unix implementation — dubbed Cooperation 2.1 — due out next month. In addition, during the past two months, NCR has made changes in the Cooperation marketing and development team.

"If they had to do it over again, obviously they would have gone with Unix first," said John Donovan, director of Groupware Services at WorkGroup Technologies, Inc. in Hampton, N.H.

A more serious problem, according to Donovan, is that Cooperation is now competing in a far wider market for groupware products that includes Lotus Development Corp.'s Notes and Microsoft Corp.'s Windows for Workgroups.

Unlike these packages, of course, Cooperation aims to tackle

Cooperation, *page 48*

From truck to customer in 20 minutes

Furniture retailer makes inventory available quicker with bar-coding system

By David A. Kelly
AVON, MASS.

Jordan's Furniture has succeeded where others have failed.

In the midst of a recessionary economy that has dealt heavy blows to the furniture industry — 1,500 furniture retailers have gone out of business in the U.S. during the last year alone — Jordan's has grown, in part because of its innovative use of new technology.

"Our computer system has allowed us to expand and grow in a controlled way. It has given us a real competitive advantage over other furniture stores," said Eliot Jordan, co-owner of the $70 million company.

Ready fast

For example, a computerized receiving system allows Jordan's three stores to make inventory available to customers just 20 minutes after it has been unloaded from delivery trucks. The system has reduced inventory errors by 90%, according to Patrick Malloy, Jordan's computer systems manager. In addition, Jordan's has gained an edge in customer service by maintaining five years of customer data on-line, Malloy said.

The center of Jordan's computing strategy is a Data General Corp. Aviion 6240 running Unix System V Release 4. About 200 DG terminals are sprinkled throughout Jordan's main store and warehouse and at its two sister stores in Waltham, Mass., and Nashua, N.H. The three stores are connected by Codex Corp. multiplexers and 56K bit dedicated lines with a backup line. Each department has its own direct line to the computer, which minimizes the risk of companywide problems.

The company's major software package is an Oracle Corp.-based furniture retail system from GE Retail in San Diego. Jordan's has been using the software since 1977.

With more than 14 trucks and 1,200 pieces of furniture coming in each day, Jordan's needs a heavy-duty tracking system. Bar-coding the receiving system has enabled Jordan's to reduce human error dramatically and make inventory available more quickly.

Ready to move

The night before a truck comes in, the receiving staff prints out bar codes for the incoming merchandise. When the truck arrives, barcode stickers are immediately placed on the furniture.

The codes are then scanned as furniture is received, stacked and stored in the warehouse, and the scanned information is uploaded to the DG host.

Salespeople can check the availability of stock by using terminals throughout the store. "We can tell [customers] exactly what we have in stock or when an item is coming in, and they can also see the price," Malloy said. "It gives them more confidence in us."

Using the new computer system, Jordan's can count inventory about 30 times a year. The process of counting and verifying inventory used to take a month and could shut down the warehouse for as long as five days. Now it is done in a week with no downtime.

While he could not chalk up a specific cost-saving figure to Jordan's computer investment, Chief Executive Officer Steven J. Gaskins said the company's early leap into high technology gave it a crucial edge. "When we put computers in in 1977, none of our competitors knew what a computer was."

Jordan's plans more changes for the coming year. By mid-1993 it hopes to install new radio frequency scanners to cut response time and mistakes, Malloy said.

ON SITE

Jordan's Furniture
Avon, Mass.

Challenge: To develop a system that will support controlled growth of the company.

Technology: DG Aviion 6240 running Unix and a retail furniture package based on an Oracle DBMS.

Results: Reduction in inventory errors, increased productivity, happier customers.

Kelly is a free-lance writer based in Waltham, Mass.

Coursey

CONTINUED FROM PAGE 47

wave of nasty Windows for Workgroups rumors that no one seems able to track down point toward Novell's concern. The company's proposed $350 million bailout of Unix System Laboratories suggests that Big Red realizes DOS-based NetWare is nearing the end of its useful life enough to significantly overspend.

At the same time, Novell's appearance as "Guardian of Unix" is a mixed blessing. Known for cobbling together high-performance, if nonstandard, software, Novell is likely to drive open systems advocates to apoplexy.

One correspondent on a Unix forum wrote, "I can just see the new product. Windows for Workgroups on top of Unix using IPX/SPX instead of [LAN Manager]. There will be some initial confusion in the network standards area that will be ironed out by [Microsoft], making code for LAN Manager public domain and turning the lower network layers into a commodity item included with almost any product."

Is that what we have to look forward to? Perhaps, especially if Novell sees Unix as a shield against the onslaught of Windows NT.

Me, I'm telling friends to take a renewed look at Apple, especially later this spring when its Open Collaborative Environment (OCE) is scheduled to begin shipping.

The demonstrations I've seen look much the way networks operate in my dreams. Whether Apple can make those dreams come true is another story, but a head-to-head comparison of electronic mail on NetWare vs. OCE is enough to show where nightmares come from.

Coursey is editor of "P.C. Letter," a San Mateo, Calif.-based industry newsletter. He can be reached as PCLETTER on MCI Mail, DCOURSEY on AppleLink and 76711,23 on CompuServe.

A smoother Unix road

CONTINUED FROM PAGE 47

Unlike most newly minted operating systems, however, UnixWare has been getting high marks from early users and independent software vendors.

"Our development experience with UnixWare has been very good. It's a stable environment with a small kernel, so we can optimize our performance," said D. J. Long, vice president of marketing at Applix, Inc., a Westboro, Mass., vendor of Unix office automation software. Applix plans to have its Asterx software available on UnixWare this month.

"It's a nice, very solid piece of work — not riddled with bugs," said Kevin Reilly, director of operations and technology at Hyatt Hotels Corp.'s technical center in Oakbrook Terrace, Ill., which uses high-end Unix servers to run applications accessed from terminals, PCs under DOS or Windows and other Unix servers.

The potential of a Novell/USL merger was good news in Reilly's view.

"Open systems usually means Unix to me, but more and more it has come to mean Novell as well," Reilly explained. "I see all of Hyatt's office automation running on Novell LANs, and suddenly I'm getting what I want: a wealth of software. My hope is that Novell provides a simple, inexpensive upgrade path for its existing NetWare servers."

Seamlessness

At Enron Gas Corp. in Houston, beta testing of UnixWare did prove its "seamless integration between NetWare and Unix," said LAN manager Jim Queen. "But I'm not interested in putting Unix on the desktop because the productivity applications are missing," he added. "Where can you find a good graphical word processor for Unix, for example?"

Answers to such questions must come from software developers motivated to write Unix applications for the desktop. Several analysts said Novell's ownership of Unix should lend it greater charm to the PC world, but virtually no one believes Microsoft is in danger of losing significant market-share there.

Yet other industry players are rooting for Novell as a counterbalance to Microsoft's domination.

"If there's one company that can convince all these companies to rally around and converge, it's Novell. That's what they've done for years: get everybody to connect," said Philippe Kahn, chief executive officer of Borland International, Inc. "In '93, I think Unix could become the server platform of choice on networked Intel machines."

NCR regroups Cooperation

CONTINUED FROM PAGE 47

enterprisewide, mission-critical applications formerly run on mainframes.

But even this apparent strength poses a marketing challenge because it means a Cooperation sale is more expensive, both in terms of up-front capital and organizational commitment from the buyer. And NCR is probably aware of the challenges that Lotus faced when customers objected to its initial Notes offering with a 200-node minimum for $62,000. Lotus eventually relented and allowed third parties to sell smaller, cheaper Notes packages.

These other products "have the advantage of allowing a bottom-up, pay-as-you-go implementation," Donovan said.

But Citibank NA, currently the largest of the handful of known Cooperation user sites, said it is still happy with its choice.

"I think Lotus' Notes and Windows for Workgroups are much more focused on communicating between people," said Gail Port, head of application development, adding that Cooperation "lends itself more to building mission-critical applications."

Citibank has 400 Cooperation users in six cities in production today and will add another 200 or so by the time its deployment is complete, the company said.

Port said she has been anxious to see the Unix server version of Cooperation appear and will migrate to it when it arrives.

"But frankly," she said, "if it had been available six months ago, we probably wouldn't have been able to take advantage of it."

Intel ships visual net manager

By Michele Dostert
SANTA CLARA, CALIF.

Intel Corp. has begun shipping LANDesk Manager, an integrated set of tools designed to provide a single, Windows-based visual interface for the administration and management of local-area networks running Novell, Inc.'s NetWare.

"The LANDesk Manager is the Veg-O-Matic of network management: a dozen tools in one package. It gets us a lot closer to the ideal of single-screen management of networks," said David Strom, a LAN consultant in Port Washington, N.Y.

Intel's new product, which is shipping now at a price of $995 per server, lets the operator remotely view, diagnose and troubleshoot a file server, query for system information and make changes to the system. An application monitoring component provides specific information useful for server load balancing, performance tuning, capacity planning and accounting management.

LANDesk Manager also contains a traffic monitoring tool that enables performance tuning and fault resolution by graphically displaying a workstation-specific and network-wide summary of packet traffic and error rates, utilization and protocol statistics. Inventory management and virus protection are also included.

"We designed LANDesk Manager for the person who actually has to administer all those servers, users and applications on all those LANs out there and needs to do it from one screen — not five different ones," said Ed Ekstrom, business unit manager at Intel's Network Products Division in Provo, Utah.

> "The LANDesk Manager is the Veg-O-Matic of network management: a dozen tools in one package."
>
> *— David Strom, LAN consultant*

Beta-test users said they were impressed by the LANDesk Manager. Kelly Russell, a state consultant at the Louisiana Office of Public Health in New Orleans, said, "Consolidating all these tools under one interface makes the network so much easier to manage. We support 137 LANs around the state, and LANDesk Manager's automatic inventory tool can make our help desk much more efficient. We can discover the user's environment just by pointing and clicking."

Intel's LANDesk Manager can currently report, via Intel's SNMP Services product, to Simple Network Management Protocol (SNMP)-based network management systems. Intel said it will add support for emerging network management standards, such as the Open Systems Interconnect Common Management Information Protocol, the Desktop Management Task Force's Desktop Management Interface and the Open Software Foundation's Distributed Management Environment.

According to Ekstrom, Intel also plans to support other LAN operating systems besides NetWare. "We'll probably develop for [Microsoft Corp.'s] LAN Manager/NT platform next and then for [Banyan Systems, Inc.'s] Vines; it will depend on customer demand."

Separately, Intel also announced two new Ethernet LAN adapter cards: the EtherExpress FlashC LAN Adapter, with on-board Intel flash memory, and the EtherExpress 16C LAN Adapter, which can be upgraded with flash memory.

The new cards, which will be available next month, automatically poll the host PC for hardware component information and store it in flash memory.

The information can then be read by the LANDesk Manager other network management products and (via Intel's SNMP Services software) SNMP consoles.

New Products

Unix

Demax Software has announced SecureMax 3.0 for the Unix environment.

SecureMax 3.0 is a distributed application that supports centralized security administration of an enterprisewide Unix security environment, according to the company.

This release features a new console designed for Hewlett-Packard Co.'s HP/UX operating system that offers users enhanced flexibility in executing security policies across the network and providing more management options. A new data collecting agent for the IBM AIX environment is also included.

Prices for Unix clients range from $6,000 to $20,000, while agent prices range from $125 to $1,500.

➤Demax Software
Suite 500
999 Baker Way
San Mateo, Calif. 94404
(415) 341-9017

Workgroup software applications

The August Corp. has released FrontLine 3.0 sales and marketing automation software.

A revamped common user access interface with mouse support, improved connectivity with client/server SQL databases and improved query speed and indexing are among FrontLine 3.0's features, the company reported.

Prices start at $1,295 for a single-user system and range to $50,000 for a multinetwork corporate development license.

➤August
10593 Oak Drive
Grass Valley, Calif. 95949
(916) 268-3691

Storage

Maximum Storage, Inc. has announced Cachet, a caching optical disc subsystem.

Cachet is compatible with PCs running DOS. The product unites a fast Small Computer Systems Interface (SCSI)-2 interface, an International Organization for Standardization 128M-byte optical disc drive and proprietary caching operating software.

Cachet's caching operating software, OptoCache, is a least recently used caching system that is automatically configured during installation. However, options such as real or extended memory and a "write through" option for power-failure tolerant systems are provided for customization.

The internal-mount Cachet System 6-INT costs $2,095; the external-mount Cachet System 6-EXT costs $2,195.

➤Maximum Storage
5025 Centennial Blvd.
Colorado Springs, Colo. 80919
(719) 531-6888

Unison Information Systems Ltd. has introduced the Opti/Max Jukebox Series.

According to the company, the series consists of a high-performance rewritable optical disc library that offers storage capacities from 10.4G bytes to 100G bytes.

Unison's proprietary memory cache technology is incorporated within the series, producing 5.5-msec access time. The series operates over any network running Network File System.

The 10.4G-byte version of the Opti/Max Jukebox Series is priced from $15,000.

➤Unison Information Systems
21 Walsh Way
Framingham, Mass. 01701
(508) 879-3200

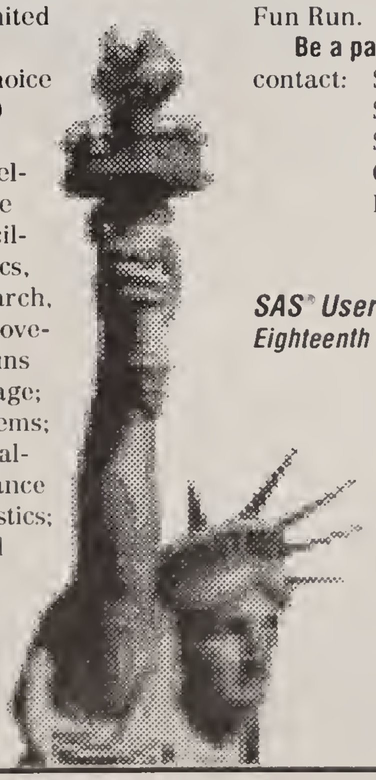
Storage Dimensions has introduced LANStor 2Fast, a high-capacity fast Small Computer Systems Interface-2 storage subsystem.

The product is based on a 5 ¼-in. form factor 2.8G-byte disk drive.

LANStor 2Fast was designed for Versions 3.11 and 4.0 of Novell, Inc.'s NetWare and is available in external configurations that include single, dual and four-drive subsystems, producing from 2.85G to 11.4G bytes of high-performance storage in a single enclosure and up to almost 80G bytes on a server, the company reported.

Prices range from $11,090 to $41,610.

➤Storage Dimensions
1656 McCarthy Blvd.
Milpitas, Calif. 95035
(408) 954-0710



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Jerry Oglesby, Conference Chair

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SOFTWARE AG BRINGS VTAM TOOL TO DESKTOP, 58
IN BRIEF, 60

VisiSoft aims for NT management

By Elisabeth Horwitt
ATLANTA

Armed with its first round of venture capital funding, VisiSoft, Inc. is preparing to mount an aggressive assault on the market for managing Microsoft Corp. networked computing environments. A key introduction slated for the second quarter is a Microsoft Windows NT-based network management system.

VisiSoft's current product, VisiNet, is a Windows 3.0-based system for monitoring usage levels on local-area network systems.

Priced between $1,995 and $2,495, VisiNet is said to manage client/server systems that are based on NetBIOS, Microsoft's LAN Manager, Novell, Inc.'s NetWare and Digital Equipment Corp.'s Pathworks, as well as devices that support Simple Network Management Protocol.

The product monitors networks in real time and collects information about CPU and disk use levels, traffic levels, and software, hardware and file configurations, VisiSoft spokesman Albert McCabe said.

Multiple monitors

One of VisiNet's more unusual features is the ability to periodically monitor different aspects of the same device — for example, a workstation's CPU, network port, power supply and operating system, McCabe added.

VisiNet can be programmed to check the status of each component at different intervals. For instance, it can monitor the power supply once a day and CPU use levels every few minutes.

An inventory module makes use of an autodiscovery feature to automatically update the configurations on various networked systems, McCabe said.

VisiSoft has had a copy of Windows NT in-house for about a year, McCabe said. One of the advantages the upcoming NT-based VisiNet will have is the ability to support multitasking, multithreading applications, he added.

One at a time

Right now, the network management system must query each device in turn and wait for a reply before going on to the next one, McCabe said.

"Even on NetWare or Windows, your whole system freezes up when it's talking to the network; that's not true of NT," which can handle multiple conversations with the network at once, a VisiSoft spokesman said.

The NT-based VisiNet will be able to manage all of the systems currently supported by the Windows-based VisiNet, in addition to Mips Technologies, Inc. machines, according to McCabe.

VisiSoft envisions smaller user sites using the Windows-based VisiNet system, which could report key information about their sites to a central, NT-based system that will be designed "for power users," he added.

VisiNet stats

Release date: Around second quarter.

Systems managed: NetWare, Pathworks, NetBIOS, SNMP, LAN Manager, Mips machines.

Key features: Simultaneous polling of multiple systems, types of statistics.

VisiNet developments for 1993: NT-based network management; LAN-based software distribution; OS/2 Presentation Manager-based GUI.

Claris swaps routers

Replaces Mac IICX with high-end device from Coral

By Joanie M. Wexler
SANTA CLARA, CALIF.

■ The lightning-fast communication afforded by today's local- and wide-area networks is now at the core of many companies' ability to deliver products to market quickly and fend off competition.

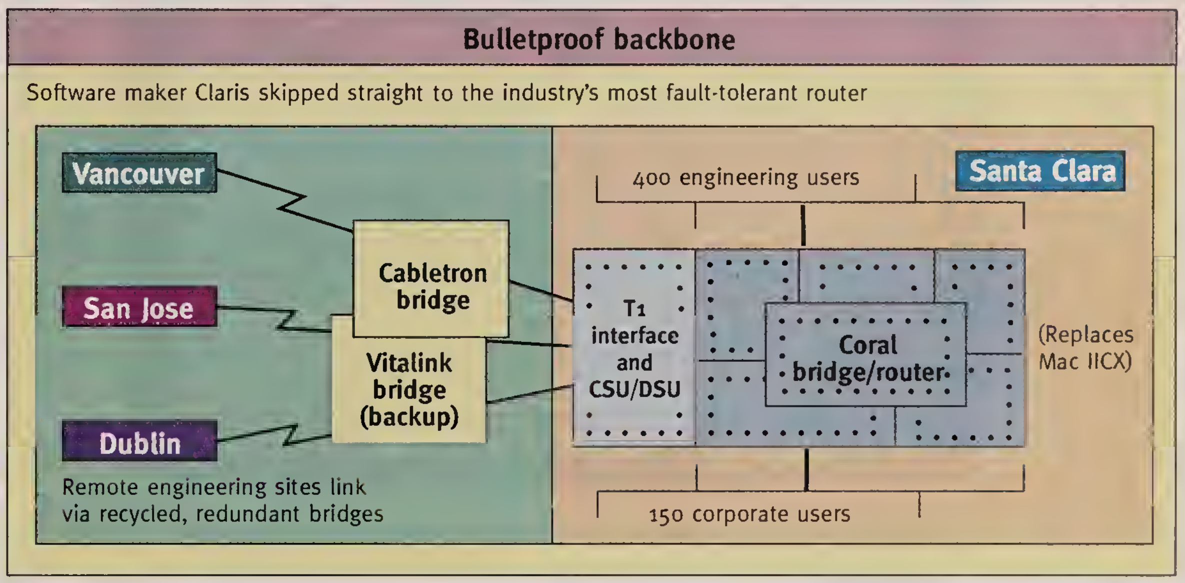
Recognizing this growing reliance on networks, information systems professionals at firms such as Claris Corp. are investing in heavy-duty, redundant internetworking equipment to make sure IS never becomes the organization's Achilles' heel.

The reason for the Claris leap: "It would be the kiss of death for the business if the network were unavailable — or even for the engineers to perceive that IS is the problem," said Ken Roux, telecommunications/network manager at Claris. "If they can't hit their schedules, you don't want it to be because of IS."

Roux said he anticipates the Coral switch to safeguard against this scenario because he purchased redundancy on every component and because of the device's nonblocking architecture. The nonblocking nature of the Coral backplane, across which multiple networks exchange information, means that attached networks do not contend for bandwidth.

Bulletproof backbone

Software maker Claris skipped straight to the industry's most fault-tolerant router



CW Chart: Stephanie Faucher

Claris, the software subsidiary of Apple Computer, Inc., two months ago made a drastic shift from using Macintosh IICXs as AppleTalk routers between Ethernet backbones to installing a high-end Coral Network Corp. Backbone Xpress.

The gear from Coral, a start-up in Marlboro, Mass., is to date the industry's most fault-tolerant internetworking device and the most expensive, costing $55,000 to $65,000 for an average configuration.

Rather, native LAN-speed circuits are nailed up to guarantee, say, a full 10M bit/sec. Ethernet link in either direction.

The Macintosh IICXs routed AppleTalk packets at just 1.2M bit/sec., and "we were starting to lose packets. The router would just blow out, and we would have to reboot," Roux explained.

Until recently, Claris routed AppleTalk packets only between two Ethernet backbones: one supporting engineering and the other running corporate applications. However, when engineering developed a need to tap into corporate's Digital Equipment Corp. VAXcluster 8530 and some new Novell, Inc. servers for electronic mail and access to common databases, the Macintosh IICX routers started to run out of gas.

Not only were the speeds no longer sufficient, but the only protocols the Macintosh routes are AppleTalk, and Claris now needed DECnet and IPX support.

Today, the Coral switch in Claris' headquarters moves multiple protocols at native LAN speeds between backbones. The device's combined T1 interface and channel service unit/data service unit links headquarters to engineering sites in Dublin; Vancouver, Wash.; and San Jose, Calif.; at 56K and 64K bit/sec. Claris recycled its Cabletron Systems, Inc. bridges

Claris, *page 58*

ON SITE

Mobil Oil
Dallas

Challenge: To share information among far-flung staff members.

Technology: WANs and Unix-based minicomputers.

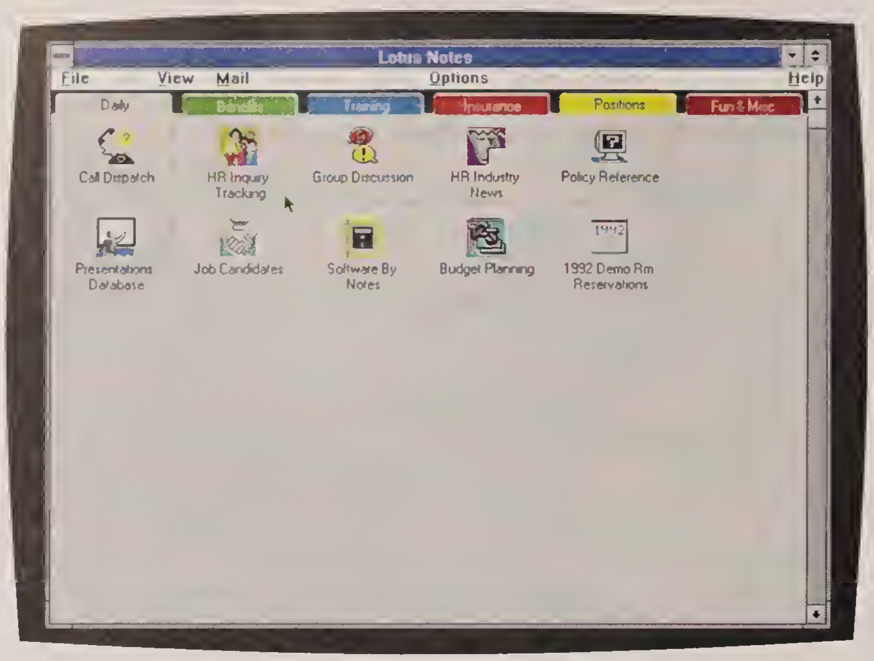
Mobil nets unite staff

By Mark Halper
DALLAS

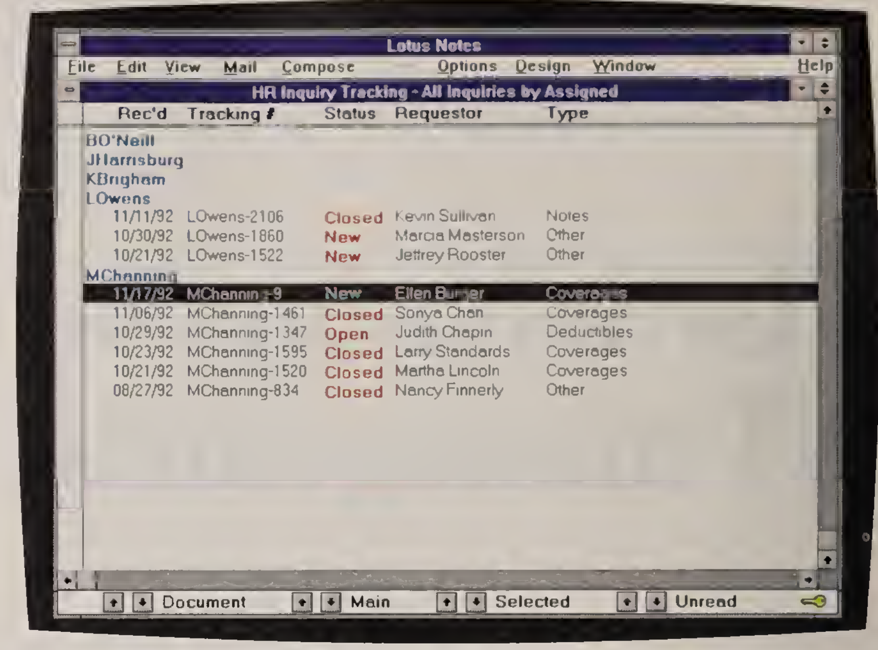
If Mobil Oil Corp. wanted to determine whether a sandstone deposit off the coast of Nigeria merited drilling oil wells, it just might call on some of its engineers in Canada, Australia, Dallas or Singapore.

Having implemented sweeping staff reductions during the last decade, Mobil has installed a series of minicomputer-based local- and wide-area networks that permit its staff in one corner of the world to share research and analysis with another that may not have available personnel or resources to do the job.

Mobil, *page 54*



1. This is Mike's Notes desktop. Each icon represents a different database. In the course of the day, these are the ones he uses most frequently. To start the day, Mike decides to check if any new benefits questions have been forwarded his way. He double-clicks on the HR INQUIRY TRACKING icon.

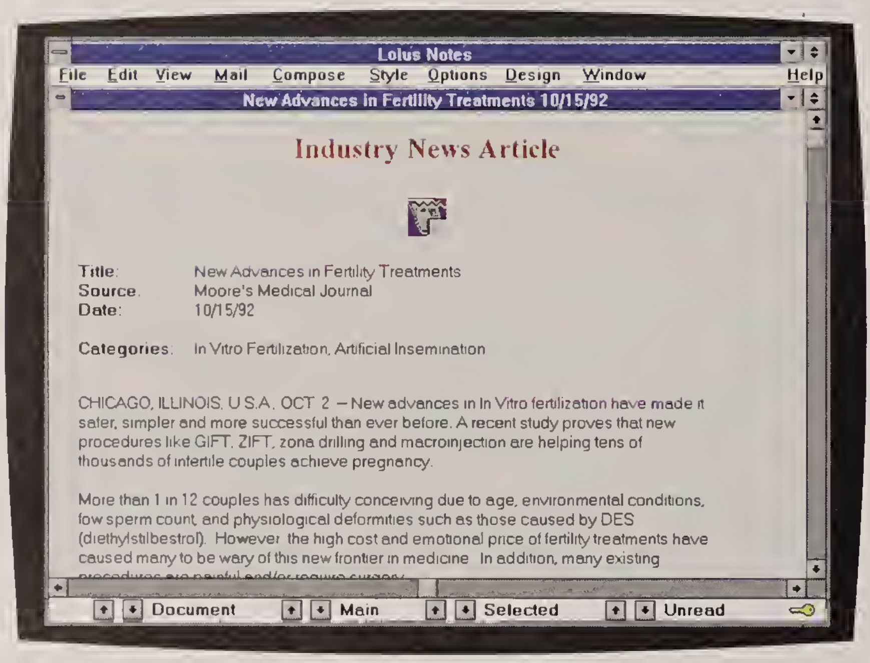


HR Inquiry Tracking - All Inquiries by Assigned

Rec'd	Tracking #	Status	Requestor	Type
BO'Neill				
JHarrisburg				
KBrigham				
LOwens				
11/11/92	LOwens-2106	Closed	Kevin Sullivan	Notes
10/30/92	LOwens-1860	New	Marcia Masterson	Other
10/21/92	LOwens-1522	New	Jeffrey Rooster	Other
MChanning				
11/17/92	MChannin -9	New	Ellen Bu er	Covera es
11/06/92	MChanning-1461	Closed	Sonya Chan	Coverages
10/29/92	MChanning-1347	Open	Judith Chapin	Deductibles
10/23/92	MChanning-1595	Closed	Larry Standards	Coverages
10/21/92	MChanning-1520	Closed	Martha Lincoln	Coverages
08/27/92	MChanning-834	Closed	Nancy Finnerly	Other

2. HR Inquiry Tracking

Well, there's one that hasn't been read. Ellen Burger has a question about her coverage. Ellen called the company's BENEFITS HOTLINE. The operator entered her query into Notes and it was automatically routed to Mike. Mike double-clicks to find out what the problem is.



New Advances in Fertility Treatments 10/15/92

Industry News Article

Title: New Advances in Fertility Treatments
Source: Moore's Medical Journal
Date: 10/15/92

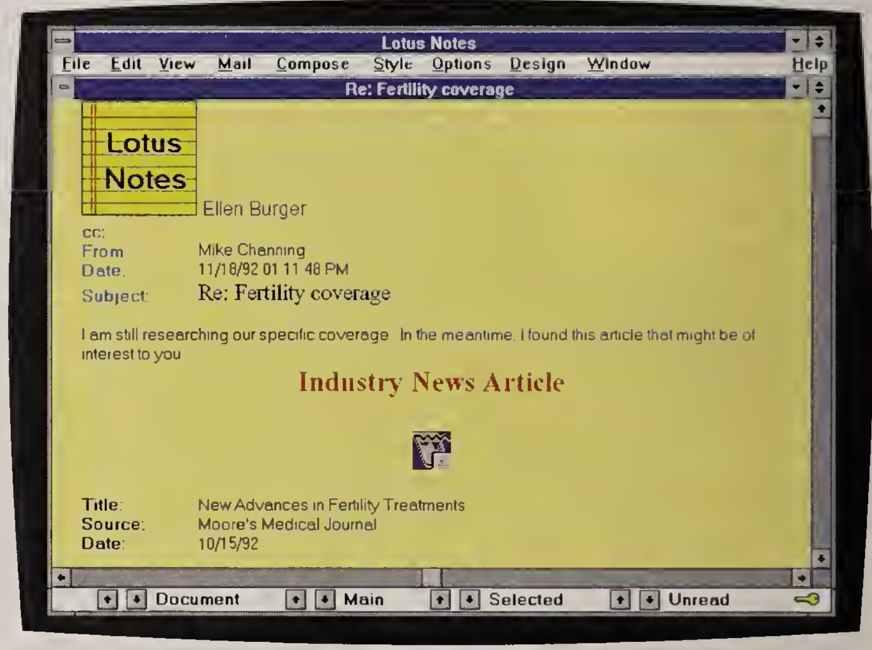
Categories: In Vitro Fertilization, Artificial Insemination

CHICAGO, ILLINOIS, U.S.A., OCT 2 — New advances in In Vitro fertilization have made it safer, simpler and more successful than ever before. A recent study proves that new procedures like GIFT, ZIFT, zona drilling and macroinjection are helping tens of thousands of infertile couples achieve pregnancy.

More than 1 in 12 couples has difficulty conceiving due to age, environmental conditions, low sperm count, and physiological deformities such as those caused by DES (diethylstilbestrol). However the high cost and emotional price of fertility treatments have caused many to be wary of this new frontier in medicine. In addition, many existing

5. HR Industry News

He simply double-clicks INDUSTRY NEWS, and searches two categories: In vitro fertilization and artificial insemination. First up is a recent story from Moore's Medical Journal. Since the article includes authoritative information, he decides to forward it to Ellen.



Re: Fertility coverage

Ellen Burger
cc:
From: Mike Channing
Date: 11/18/92 01 11 48 PM
Subject: Re: Fertility coverage

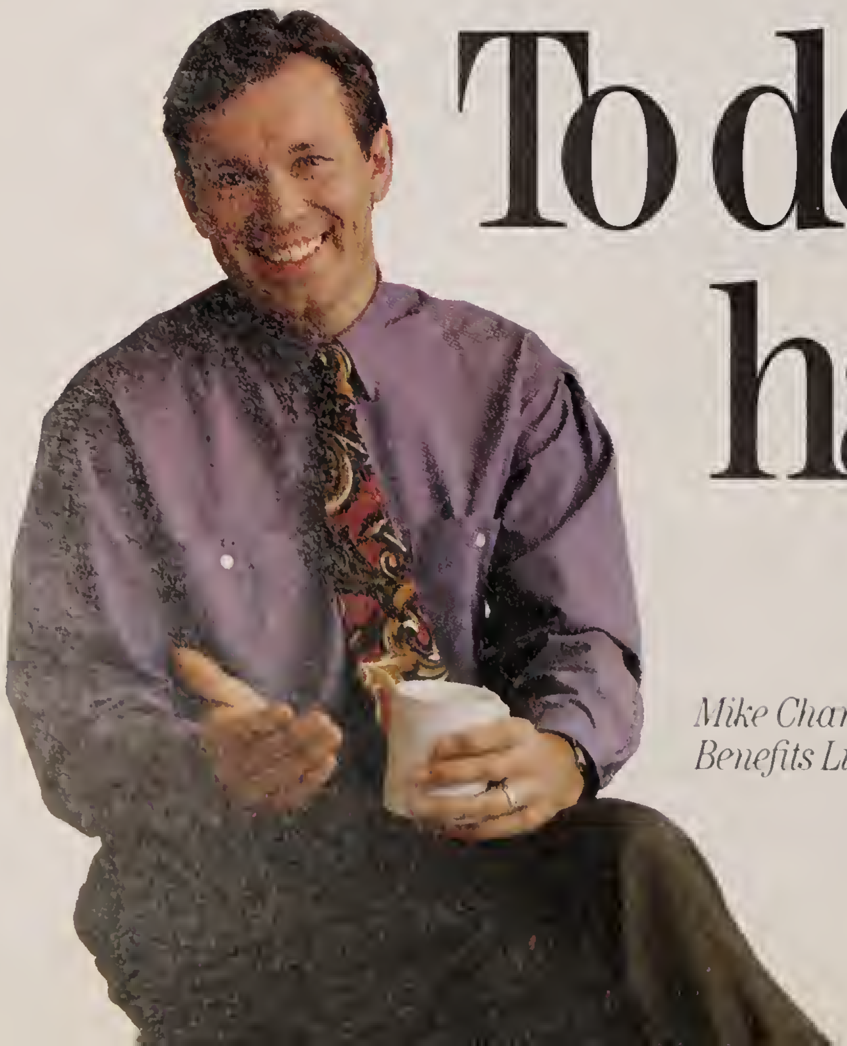
I am still researching our specific coverage. In the meantime, I found this article that might be of interest to you

Industry News Article

Title: New Advances in Fertility Treatments
Source: Moore's Medical Journal
Date: 10/15/92

6. HR Industry News

Mike quickly composes a note and forwards this document directly to Ellen. That done, he gets himself a cup of coffee.



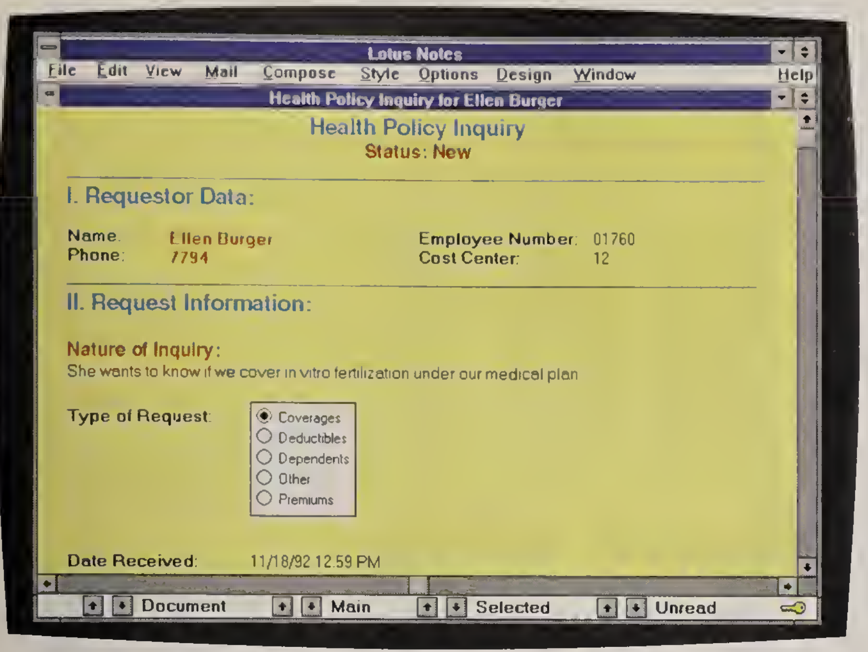
To demonstrate th
had to make an

Mike Channing
Benefits Liaison

According to critics, including our competition, Lotus Notes® is one of the most exciting software products you can buy. We'd like to show you why.

More than an application development environment and much more than e-mail, Notes enables users to share knowledge anytime, anywhere. With it, you can build a new class of networked applications, without special programming skills.

Let's watch how Mike Channing uses it: As a tracking tool for customer service. As a conferencing system for collaborative problem solving. And as a library for policies, documentation or news.


Lotus Notes
File Edit View Mail Compose Style Options Design Window Help
Health Policy Inquiry for Ellen Burger
Document Main Selected Unread

Health Policy Inquiry
Status: New

I. Requestor Data:

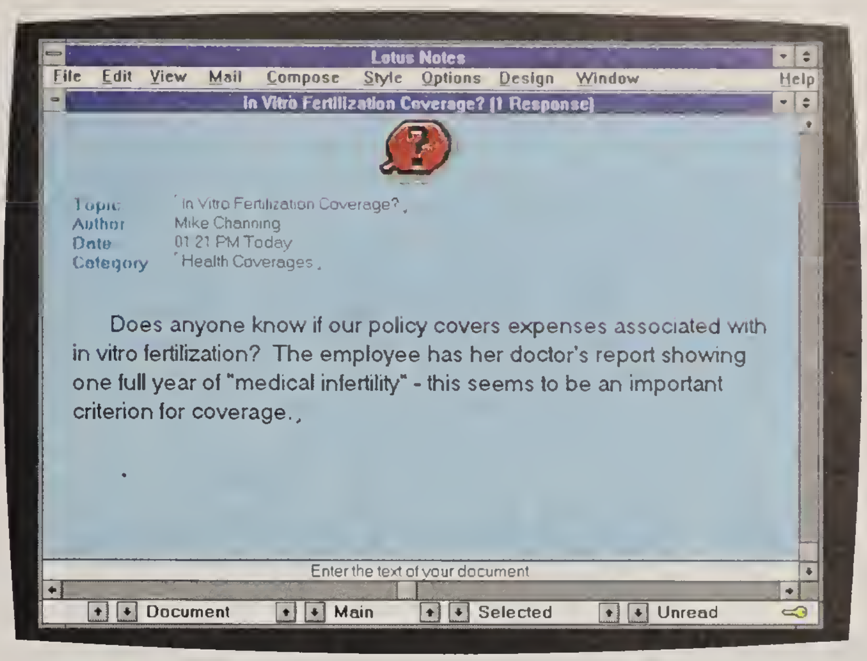
Name: Ellen Burger
Phone: 7794
Employee Number: 01760
Cost Center: 12

II. Request Information:

Nature of Inquiry:
She wants to know if we cover in vitro fertilization under our medical plan

Type of Request:
● Coverages
○ Deductibles
○ Dependents
○ Other
○ Premiums

Date Received: 11/18/92 12:59 PM


Lotus Notes
File Edit View Mail Compose Style Options Design Window Help
In Vitro Fertilization Coverage? [1 Response]
Document Main Selected Unread

Topic: In Vitro Fertilization Coverage?
Author: Mike Channing
Date: 01:21 PM Today
Category: Health Coverages

Does anyone know if our policy covers expenses associated with in vitro fertilization? The employee has her doctor's report showing one full year of "medical infertility" - this seems to be an important criterion for coverage.

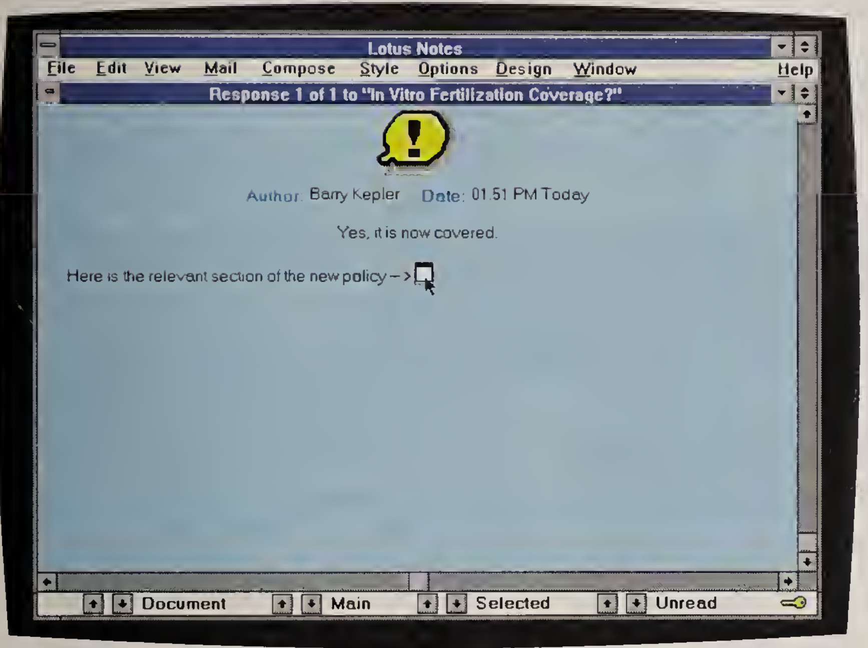
Enter the text of your document

3. HR Inquiry Tracking

Up comes the inquiry screen. Ellen wants to know if the company covers in vitro fertilization. Mike, being new, is stumped. He calls his supervisor on the phone for the answer. He's not in yet. Instead of waiting, Mike decides to post the question on the GROUP DISCUSSION database, thinking that someone else might know the answer and respond more quickly.

4. Group Discussion

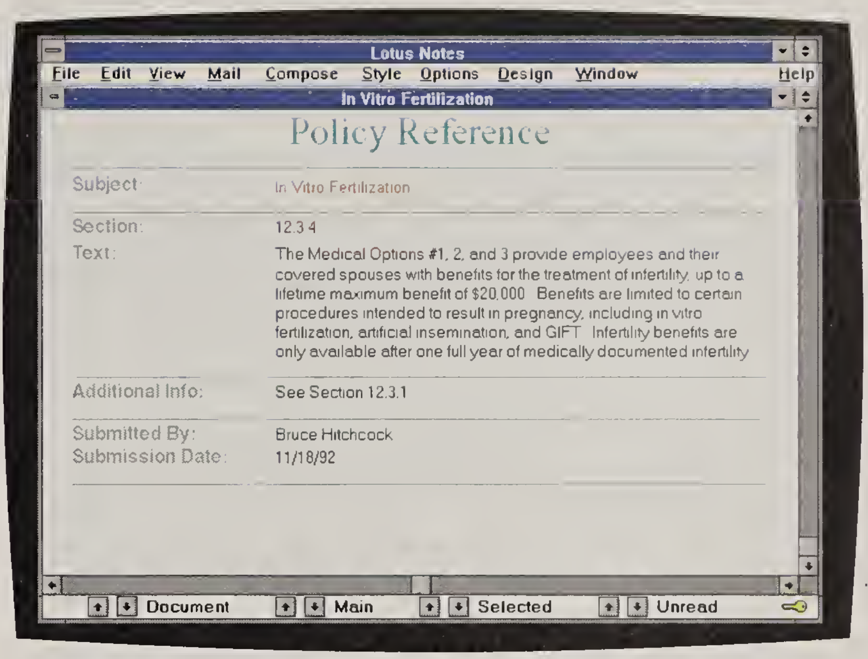
He double-clicks the GROUP DISCUSSION icon. Once in GROUP DISCUSSION, he poses the question to his workgroup. Eager to help, Mike then decides to check out the INDUSTRY NEWS database for any background information that might be useful to Ellen.


Lotus Notes
File Edit View Mail Compose Style Options Design Window Help
Response 1 of 1 to "In Vitro Fertilization Coverage?"
Document Main Selected Unread

Author: Barry Kepler Date: 01:51 PM Today

Yes, it is now covered.

Here is the relevant section of the new policy -->


Lotus Notes
File Edit View Mail Compose Style Options Design Window Help
In Vitro Fertilization
Document Main Selected Unread

Policy Reference

Subject: In Vitro Fertilization

Section: 12.3.4
Text: The Medical Options #1, 2, and 3 provide employees and their covered spouses with benefits for the treatment of infertility, up to a lifetime maximum benefit of $20,000. Benefits are limited to certain procedures intended to result in pregnancy, including in vitro fertilization, artificial insemination, and GIFT. Infertility benefits are only available after one full year of medically documented infertility.

Additional Info: See Section 12.3.1

Submitted By: Bruce Hitchcock
Submission Date: 11/18/92

7. Group Discussion

When he gets back to his desk, Mike checks back into the GROUP DISCUSSION database for responses. Not only has Barry Kepler responded with the answer, Barry actually leads Mike to the relevant section of the corporate policy manual by creating a direct link to the document.

8. Policy Reference

Mike clicks the DOC LINK icon. Up comes the relevant section of the policy. Mike jots a quick message and forwards both to Ellen. Job done, in less than 10 minutes, by easily tapping into expertise both inside and outside the company.

e power of Notes, we
example of Mike.

Watch how Notes organizes information so it's easy for Mike to get the answers he needs. How effortlessly he taps his workgroup's knowledge. How quickly he accesses conventional references. Now you can see why people who have Notes build their work around it. And why the companies that have installed Notes have seen as much as a 400% return on their investment.*

Now, consider that any business can afford it. A Notes Group Pack™ will have ten people working together for under $5000. It includes 10 of our most popular Notes applications including SALES MANAGEMENT, CALL DISPATCH and GROUP DISCUSSION, as well as complete installation and usage documents. For information call **1-800-828-7086, ext. 7326,** or your local Notes VAR.

Lotus® Notes

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Mobil unites staff

CONTINUED FROM PAGE 51

"We can't always afford to move people to a problem," noted Eric Dion, technical team leader at Mobil's exploration operations. "We need to be able to bring technical expertise to solve a problem irrespective of where people and problems are located."

The cornerstone of the $5 million Mobil system is Hewlett-Packard Co.'s HP 9000 minicomputer.

Mobil is in the process of installing the Unix multiuser systems as servers at 11 sites around the globe. The servers feed nearly 1,000 PC and workstation users engaged in operations ranging from word processing and spreadsheet accounting to seismic and chemical analysis.

The HP system alters Mobil's technology landscape twice: It replaces an IBM mainframe-based Professional Office System (Profs) electronic-mail system with HP Open Mail, and it supplants a series of Digital Equipment Corp. VAX systems that the company had used for sharing technical information in a more rigid manner than the open HP system permits.

The VAX phaseout is a corporatewide effort that parallels Mobil's move from the VMS operating system to open systems, and it affects several operations in addition to the exploration group, Dion said.

The company is phasing out the VAX system that has been serving its geophysicists, geologists and other technical staff members but is keeping its IBM mainframe for other company operations outside the exploration unit, according to Dion.

Dion recalled that in the IBM and DEC environments, "We did not have the computing tools necessary to allow our exploration team to work together closely. We could not depend on peer-to-peer communications."

Although the VAXs permitted intercontinental users to swap technical data and diagrams, the operations were not taking place in real time, he explained.

With the HP system, a Mobil scientist drawing a diagram or performing an analysis in say, Indonesia, can send real-time renderings to his or her counterpart in Norway, Dion said.

Many of the PCs are already installed, as Mobil purchased them in recent years for uses other than for the HP system. Mobil is outfitting them with HP's New Wave operating environment sitting on top of Microsoft Corp.'s Windows operating environment. Mobil decided to add a New Wave layer for enhanced object orientation and file folder capabilities, Dion said.

The company is upgrading any sub-386 level PCs to 486s, a process that affects fewer than 20% of the division's PCs, he noted.

Users' choice

Mobil gave its users a choice of PCs or workstations or both. According to Dion, about 80% chose PCs and fewer than 10% chose both. The workstation users have jobs that are heavily technically oriented, while PC users perform a combination of office automation and scientific tasks, he said.

With assistance from HP, Mobil is tying together PCs through a Novell, Inc. LAN and linking workstations via Transmission Control Protocol/Internet Protocol.

According to Dion, Mobil has selected a number of applications that have been ported to both systems, and users are able to swap data across PC and workstation platforms.

Mobil is installing the systems in two phases. It expects to have 380 PCs and workstations tied into the HP servers by March. It will hook the remaining 500 within two years after that, Dion said.

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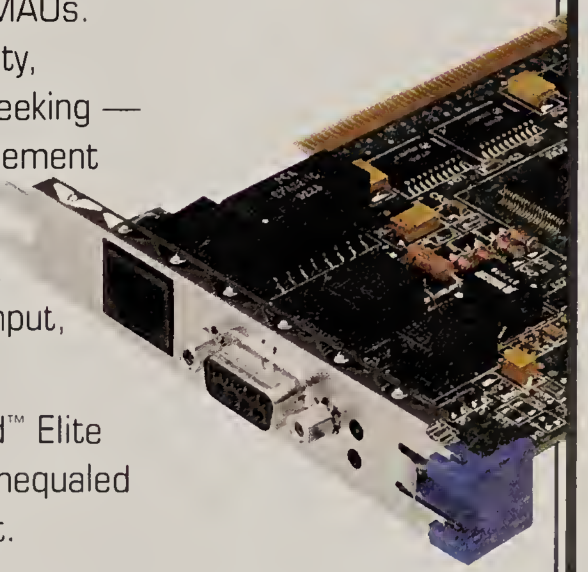

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Software AG extends VTAM dial-up access

By Gary H. Anthes
RESTON, VA.

Software AG of North America, Inc. announced that it will ship this quarter a version of its Net-Pass software, which allows remote PCs with dial-up connections to open mainframe VTAM sessions. The tool allows users to toggle between mainframe applications without logging off and back on.

Version 3.1 of Net-Pass, or Network Parallel Application Sessions System, provides access to applications developed in a number of major programming languages running under teleprocessing systems in VTAM environments such as CICS, TSO, IMS/DC and COM-PLETE. The product can "hot key" between applications running in separate partitions or on separate machines, according to Joe Abusamra, product marketing manager.

Abusamra said the product will be used by systems and applications programmers and operations personnel as a productivity enhancer. For example, he said end users can also use it to move easily between an order-entry system, an inventory application and electronic mail. "If you have enterprisewide computing and you have systems around the world, as long as they are tied together you can hot key between them, share data and so forth," he said.

Mainframe-based Net-Pass provides asynchronous 3270 support and requires the use of Software AG's Entire Connection terminal emulation and file transfer software running on a PC.

Net-Pass will be available for MVS, MVS/XA and MVS/ESA this quarter and for VSE, VM/GCS and ACF/VTAM sometime in the future, the company said. Pricing begins at $12,600.

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Claris swaps routers

CONTINUED FROM PAGE 51

out to the remote sites as primary internetworking devices in those locations, backed up by some recycled Vitalink bridges for redundancy (see diagram page 51).

While Roux said the Claris network previously experienced just 2% to 3% downtime — "below the industry average" — even that became unacceptable "as we found ourselves relying on the network to develop our product."

The firm feared remote engineers being isolated from those at headquarters, which would slow down development time, he said. "The faster you can get tested, proven product out there, that's direct income into your coffers," and the network has become a major vehicle for that, Roux said.

In a time of economic uncertainty for many companies and their computer products vendors, Roux shrugged off the fact that Coral is a relatively new player that experienced a couple of rocky years with management shifts, product redesigns and scramblings for refinancing.

"I'm not sure you can go by the longevity or bigness of the vendor anymore," Roux said. "Coral seems to have solved its problems. I look at what they're doing today, and they're doing the right things. I mean, IBM is going to lay off 24,000 people."

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In Brief

Networld to change hands

The biannual Networld show — playing in Boston this week — is due to change hands in 1994 when **Bruno Blenheim, Inc.**'s exclusive license agreement with **Novell, Inc.** lapses. However, the ultimate owner of the highly popular local-area network conference remains unclear. Bruno Blenheim said it will continue to operate essentially the same show in 1994 under the name Networks Expo. The firm emphasized it still owns the essential property, including "the venue contracts, the database of attendees compiled over the years" and the goodwill attached.

Meanwhile, Novell has licensed the rights to Networld to **Interop, Inc.**, which said it plans to put on a combined Interop/Networld show.

LAN technician test debuts

Lanop Corp. has introduced a Certified Network Technician Program that is said to test whether LAN technicians can implement the correct procedures for installing and configuring Novell LANs. In order to be certified by the program, a manager must perform a series of hands-on network procedures, such as installing NetWare 2.1x and 3.1x, installing and configuring a Token Ring LAN, setting up a mirrored drive configuration and debugging a complex LAN that has been "bugged" with an assortment of hardware and software, LAN and PC problems, Lanop said.

Longest LAN link announced

Cray Research, Inc. and **Network Systems Corp.** recently announced that they put together the world's longest distance LAN link: a 1G bit/sec. connection over a distance of 26.9 miles. The link, which was made via a 1.2G bit/sec. fiber-optic service provided by **US West**, made use of a Network Systems PS-32 High Performance Parallel Interface (HIPPI) switch and HIPPI extenders from **Broadband Communications Products, Inc.** in Melbourne, Fla. HIPPI is a standardized channel that can carry up to 800M bit/sec.

ISDN compatibility update

Fujitsu Network Switching of America, Inc. is making available cartridges that update its digital telephone sets and terminal adapters to National Integrated Services Digital Network (ISDN)-1 compatibility. The cartridges are being offered free to Fujitsu's ISDN terminal customers until June 30. National ISDN-1 is a recently completed standard for ensuring interoperability across multivendor, ISDN-based switches and equipment.

Ultra joins HP program

Ultra Network Technologies, Inc. has joined **Hewlett-Packard Co.**'s Workstation Interface Program in order to work jointly with HP on high-speed connections for HP Apollo 9000 Series 700 workstations.

ISDN implementation aid

Network managers looking for tips on how or whether to implement ISDN might take a look at *Sensible ISDN Data Applications*, by Jeff Neil Fritz, West Virginia University Press, 1992. Fritz is a data communications analyst at the university, and he has had extensive hands-on experience implementing ISDN. The book is priced at $29.95. To order, call (304) 293-5267.

24-hour support center debuts

Syntrex Technologies, Inc. has established a network management and support center through which it will provide remote management of customers' networks 24 hours a day, the **Phoenix Technologies, Inc.** subsidiary said.

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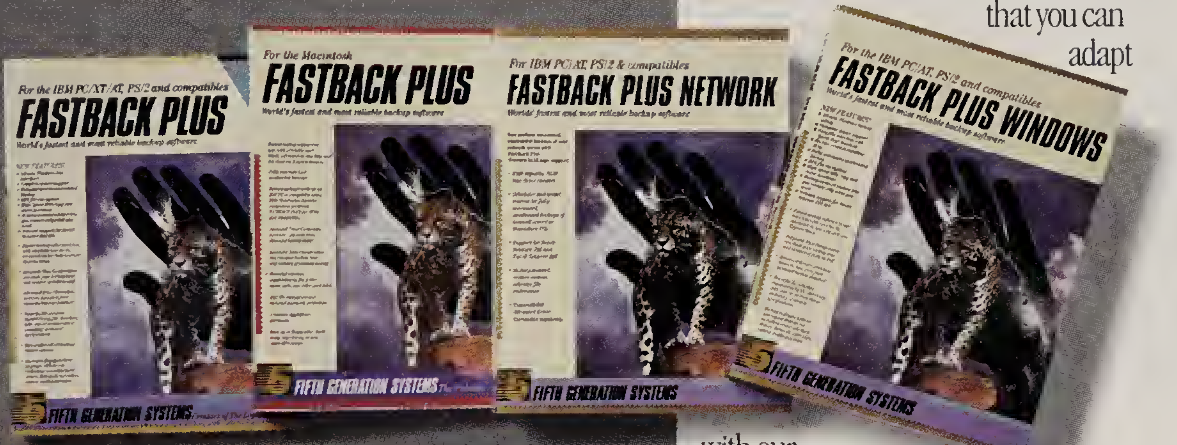
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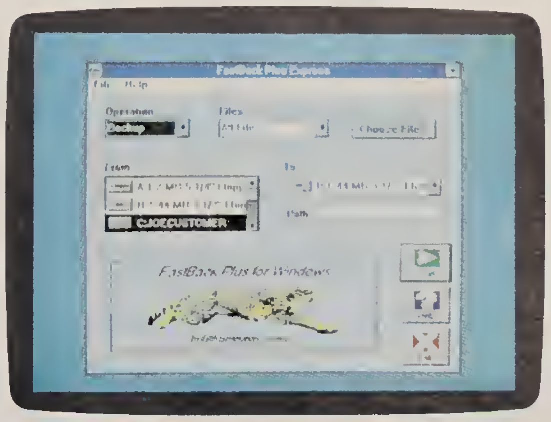

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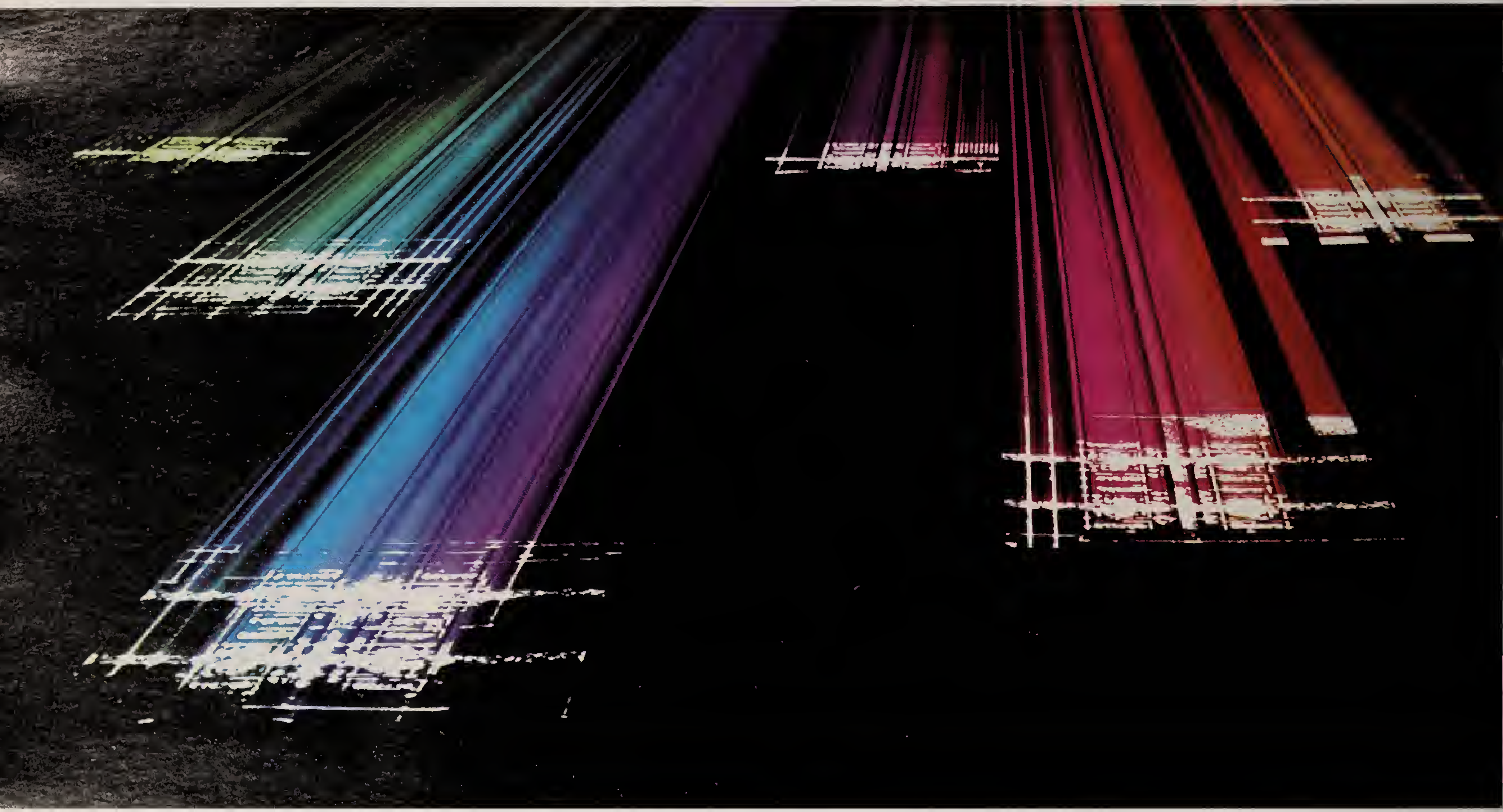

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PARALLEL PROCESSING, 64
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Distributed app reduces customer response time

By Johanna Ambrosio

Customer service has been re-energized at Wisconsin Power & Light Co. by a distributed application that has cut response time to customers from minutes down to seconds.

"Our goal was to answer 80% of the calls in three rings, which is about 20 seconds," said Dennis Vickers, director of information planning and operations at the Madison, Wis.-based concern. "Before, in some cases, customers were hanging on for 15 minutes. That doesn't happen anymore."

For the month of October, the latest for which statistics are available, customer service representatives achieved the 20-second goal 79% of the time, Vickers said.

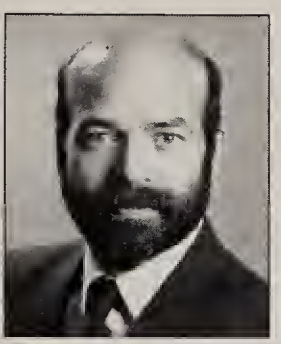
Along the way, the utility also implemented a local-area network backup system for its mainframe-based customer information application.

The customer service center, opened last December, is in Janesville, 40 miles away from the corporate data center in Madison, where an IBM 3090-300E mainframe is housed. Employees, mostly part-timers, use IBM Personal System/2s connected to the mainframe via IBM's LAN Server software to access an application residing on the host's 40G-byte IMS database management system. An automatic call distribution system parcels out phone calls to available operators.

Customers call in with problems ranging from emergency power outages to billing questions and change-of-address requests. Employees can access a customer file on the mainframe, answer questions, issue a work order and update the host file.

The center handles about a half-million

Distributed, *page 64*



Dennis Vickers: *Response time critical*

ON SITE

Wisconsin Power & Light Co.
Madison, Wis.

Challenge: To speed response time for customer calls.

Technology: A LAN works in concert with a mainframe to help distribute the call load.

Server arena crowded

PCs, minicomputers take aim at superserver market

By Kim S. Nash

■ As multiprocessing chips increasingly enable PCs to elbow into superserver turf, minicomputer makers are at the same time repositioning their proprietary machines as servers. Choices abound, but prices for such high-performance boxes are still a sticking point.

For now, users have to balance cost with needs such as fault tolerance and high availability of data, according to a recent report from Summit Strategies, Inc., a consulting firm in Boston. The report, "Capitalizing on the Collision of Supermicros and Proprietary Minis," outlined the positioning of several vendors and how their products overlap.

For example, companies such as NetFrame Systems, Inc. and Tricord Systems, Inc. have so far targeted users who want to consolidate the functions of a handful of PCs. Meanwhile, PC players including Dell Computer Corp., IBM and Compaq Computer Corp. have taken a chunk out of that pie with high-end PC servers.

A key challenge for PC companies, however, is providing the network and client/server support users now demand, said Tom Kucharvy, president of Summit Strategies.

Service and price are dictating the pace of Montana Power Co.'s migration off Prime Computer, Inc. minicomputers. The Butte, Mont., utility is slowly moving applications from two of six proprietary Prime boxes to a combination of Unix machines and PC servers. Superservers were considered but "were just too pricey for us," according to Dan Olsen, lead system programmer.

Montana Power has moved some database and spreadsheet applications from a Prime 6450 minicomputer to local-area networks centered around IBM Personal System/2s. A standard server cost the company about $10,000 while an entry-level superserver was approximately $65,000, Olsen said. "It has more performance, but we weren't able to justify that expense," he explained.

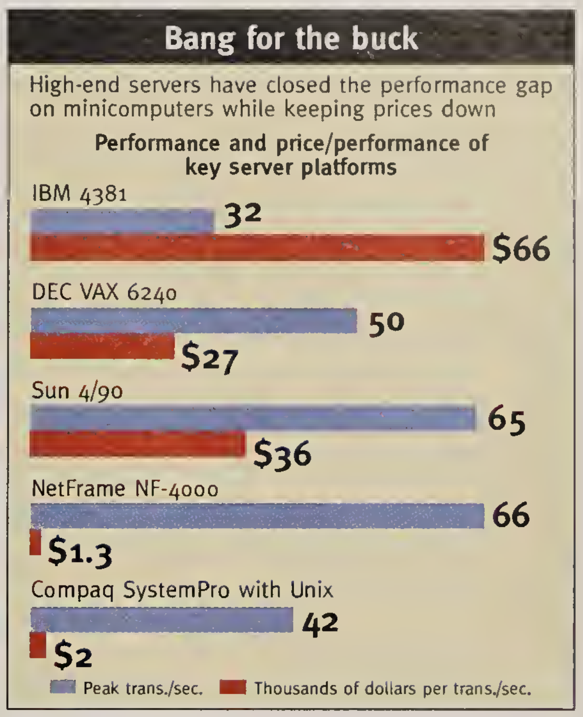
The company is also shunting off engineering and other compute-intensive programs from a Prime 6450 to a DECstation 5000 from Digital Equipment Corp., while generic applications such as databases and spreadsheets are destined for IBM RISC System/6000s.

Bob Griffin, a vice president at Bank of New York, said he is "interested" in multiprocessing servers but that he will not make a move from the IBM 3090 mainframe world while the software to run on multiprocessing servers remains elusive. "We're not really doing production processing on LANs or PCs right now, and that probably won't change for the next year or so," Griffin said.

TransAmerica Corp. bought an entry-level superserver from NetFrame because of its "guaranteed data integrity and high reliability," according to Cathy Daley, information systems manager.

The San Francisco-based bank runs a mission-critical human resources application on NetFrame's NF200ES, a 486DX-based multiprocessing box with built-in fault-tolerance features designed for small networks. The machine has a combination of power and reliability that "you can't get anywhere else [and] for less than the price of a PC server," Daley said.

Chevron Canada Ltd., a Vancouver, B.C.-based sales and distribution arm of Chevron Corp., tested several servers before settling on two Model 290s from Parallan Computer, Inc. Among the contenders were Compaq's SystemPro, a NetFrame server, Tricord's PowerFrame and systems from IBM and DEC.



Bang for the buck

High-end servers have closed the performance gap on minicomputers while keeping prices down

Performance and price/performance of key server platforms

Source: Computer Support of North America/Summit Strategies, Inc.

Security Toolkit/Unix Version 2.0 debuts

By Melinda-Carol Ballou
ROCKVILLE, MD.

Raxco Software, Inc. released a new version of a security assessment tool designed to run simultaneously on multiple Unix systems while maintaining a database of file attributes to gain security information about the systems.

Security Toolkit/Unix (STK) Version 2.0 automates security checks and helps ensure proper administration across platforms by assessing changes that occur to the system and how it is configured, officials said.

"The most significant thing about the new release is that it is client/server. For us this means that you can run STK from one machine and have it run on other machines on the network," said Doug Conorich, Unix product manager at Raxco. "You can centralize all the reports on one machine and update baselines, for instance."

Raxco plans to offer support for STK security across VMS and Unix platforms by the end of 1993, Conorich said.

Version 2.0 also features a command line interface that enables users to run STK from a script file as opposed to merely via a graphical user interface.

"We started out with ease of use, but there are a lot of people out there who wanted the command line and the ability to run the program automatically at certain times, for instance," Conorich said.

Expanded reports

Reporting improvements include sorted output, extended data and three report formats: short, medium and long. The longer reports explain detected problems — why they are a security concern and how the user should correct the problem, company officials said.

Version 2.0 also offers "Summary" options that let users view the problems found by each security test and the time of each test on a single screen, the officials added. Test results can thereby be consolidated into one summary from an entire network, they said. The results can also be formatted and sorted when viewing the test results, not during runtime, for easier analysis, the officials added.

STK Version 2.0 is shipping now and is priced from $582 to $11,842 on Unix workstations.

Users gain benefits of parallel processing

By Elisabeth Horwitt
BROOKLINE, MASS.

VXM Technologies, Inc.'s PowerTools, released last month, promises to bring the performance benefits of network parallel processing to reusable, specialized tasks that users have to do on a regular basis. This broadens the scope of parallel processing beyond the "monster" financial analysis or physics applications that are its traditional bailiwick, according to Franco Vitaliano, VXM president.

PowerTools is a set of library routines that handle process synchronization across a cluster of multivendor Unix machines. However, while traditional parallel processing applications typically eat up all the CPU resources of a parallel processing network, PowerTools was designed to develop smaller subroutines that groups of users can be running simultaneously on a "cluster" of Unix systems, VXM said.

For example, instead of having each Wall Street trader run the complicated, computer-intensive calculations needed to figure bond yield, "why not have one trader incorporate the calculations formulae into a subroutine?" Vitaliano said. The subroutine could then be called up by a whole group of traders, and the CPU-intensive calculations could be parceled out among a cluster of networked parallel processing systems whose resources are shared by the group, he added.

PowerTools supports parallel processing across a mixture of Sun Microsystems, Inc., Hewlett-Packard Co., IBM, Silicon Graphics, Inc. and Digital Equipment Corp. Unix systems, the company said. And VXM's existing Balans technology is said to automatically balance processing loads across such clusters.

Virtually the same

The use of Parallel Virtual Machine (PVM), a parallel processing technology developed by Oak Ridge National Laboratory, enables a group of such networked systems to match or surpass the power of a Cray Research, Inc. supercomputer, VXM said.

VXM has differentiated itself from other PVM supporters, such as Cray and Convex Computer Corp. by integrating PowerTools with Sun's ToolTalk, which allows reusable subroutines to be encapsulated as objects that can be called up by any application that supports ToolTalk, Vitaliano said. Lotus Development Corp. is one leading software company that has announced support for ToolTalk.

PowerTools is available now, priced at $2,500 for 10 nodes. Support for Microsoft Corp.'s Windows NT and Windows is in the works for next year, Vitaliano said.

Remote vs. parallel

While remote procedure call technology enables applications to be parceled out across multivendor networked systems, such systems are sequential — each system waits for the previous one to finish its allotted task before beginning its work. With parallel processing, a group of machines are all working on different chunks of the same job in tandem.

Application reduces customer response time

CONTINUED FROM PAGE 63

calls each year.

"Response time from the PCs to the host was a critical issue," Vickers said. However, "we didn't want to locate the customer service center in downtown Madison because of space costs." But so far, access time has not been a problem, he said. The LAN is connected to a 3174 controller that is channel-attached to the mainframe.

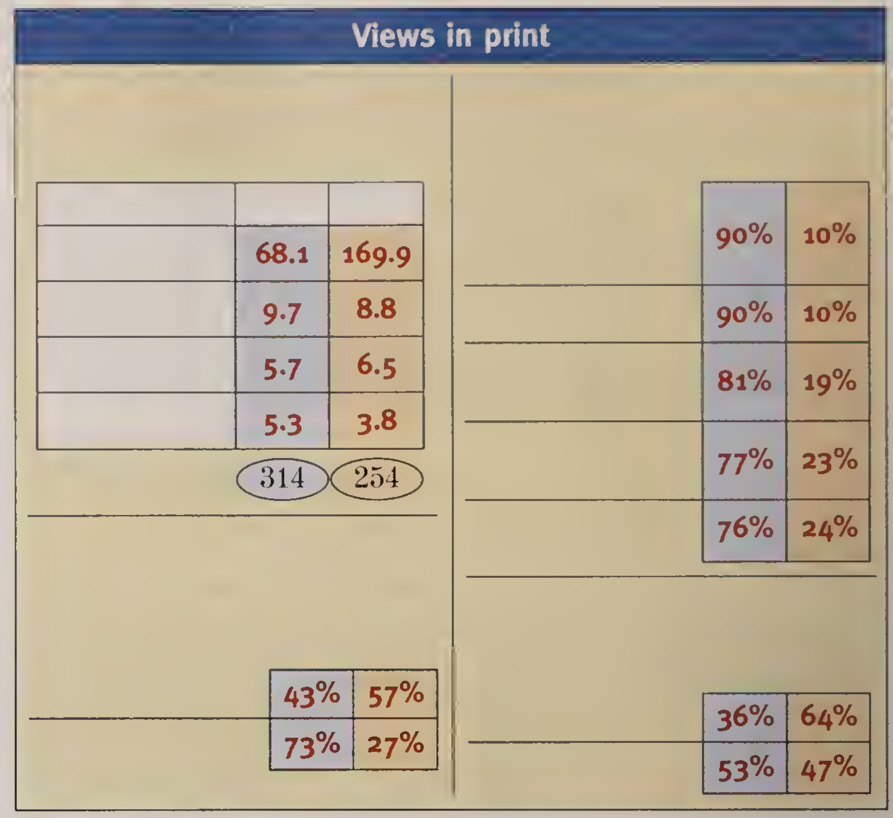
There is a small subset of the mainframe data residing on a server in Janesville, about 1.5M bytes' worth. It includes only the name and address and some other very limited information about each customer. However, it has been useful when storms or other causes have knocked out the network that connects the service center to the mainframe. The server-resident minidatabase is updated every night by the mainframe, so its data is no more than a day old.

Still, that approach has some shortcomings, Vickers said. "If the network or mainframe goes down, there's no way to print out work orders remotely in the field offices. So we have to fax things." Also, he said, if employees use the server database, they must re-enter transactions on the mainframe when the link is reestablished.

"We don't like having systems that have rework built in," Vickers said, "but if the rework is cheaper than upgrading the system, it's probably what you want to do. We're not using the backup database enough so that it's a real problem."

The utility is planning to change parts of its application. It will move from the OS/2 Extended Edition DBMS on the server to Oracle Corp.'s Oracle and move from IBM's LAN Server software to Novell, Inc.'s version. "We're making both moves for the same reason. We adopted both Oracle and Novell as corporate standards because of the number of platforms they can support," Vickers said.

"We're bringing in Unix platforms for some new applications, including work management and an inventory of gas and network components," Vickers said. "I don't see the mainframe going away anytime soon."



Study finds disaster vulnerability outside the glass house

By Thomas Hoffman
NORTH BERGEN, N.J.

Although most organizations have adopted adequate disaster recovery strategies to protect their data centers, they are overlooking PC local-area networks and other operations outside of the glass house, according to a study released recently.

The study, commissioned by Comdisco Disaster Recovery Services, was based on a telephone survey of 300 information systems executives at large corporations. The results, audited by ICR Survey Research Group in Media, Pa., were used to develop a "vulnerability index" ranging from 0 (minimum vulnerability) to 100 (maximum vulnerability) for major computer system disruptions.

According to the results, only 59% of the respondents have a formal plan to follow if business is disrupted. But the study assigned a vulnerability score of 67 to the average corporation's LAN preparedness.

"I don't think people have paid enough attention to protecting their PC LANs. It's like a ticking time bomb," said Paul Polishuk, president of IGI Consulting, Inc. in Boston.

Banks most prepared

Of the industries surveyed, financial services companies make the most extensive preparations for disruptions to their data centers and LAN work areas. That is largely the result of stiff federal regulations that the Federal Deposit Insurance Corporation (FDIC) and other regulatory agencies impose on the banking industry, according to David A. Moore, senior vice president at Mellon Bank Corp. in Pittsburgh.

Moore said the FDIC and other regulatory concerns have been tightening the disaster recovery guidelines for banks since 1984.

Annual updates

In addition, Moore explained that Mellon's IS group is required by the company to present its disaster recovery strategies to the bank's board of directors annually.

"We've spent an awful lot of time planning for these contingencies," he added.

Manufacturing and services firms fared worst on the study's index, with manufacturers receiving a score of 82 for PC LAN vulnerability.

Users "still have to come to grips with recovering technology outside of the data center," noted Anish Mathai, vice president of technology/strategic planning at Bankers Trust Co. in New York.

One of the biggest hurdles in developing an effective PC LAN disaster recovery plan, Mathai said, is the complexity of replicating the interfaces and workstations that connect to LANs outside the data center.

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IBM Business Partner

County gets Bullish on tracking child support evaders

By Christopher Lindquist

It may be hard to imagine a parent who chooses to avoid child support payments, but the truth is that thousands of children each year are the victims of parents who fail to meet child support obligations after a divorce.

The tracking of these delinquent parents is a time-consuming task, especially for already overburdened case workers. In San Bernadino County, Calif., each child support officer used to carry an average caseload of 1,000 delinquent parents. To ease the load, the county decided to automate as much of the tracking process as possible.

After a several-year evaluation process, a software product was found that seemed to fit the bill — Troy, N.Y.-based CSE Resources, Inc.'s Support Enforcement Tracking System. CSE then joined with Bull HN Information Systems, Inc. to port the software to a Bull DPS 6000 minicomputer. The software and minicomputer were then attached to some 200 terminals and PCs around San Bernadino County.

A poor California economy has led to 70,000 new cases of delinquent parents in San Bernadino County, up from 40,000 last year.

Ease the burden

The system's goal was to eliminate the manual system of filing and searching for information on delinquent parents and replace it with an automated system that would allow easier tracking.

"We were an entirely manual operation and were simply getting inundated with case work," said Michael J. Kewin, chief deputy district attorney for special operations.

Under normal circumstances, a new case is created when the Welfare Department informs the Child Support Enforcement Division that a single parent is filing for welfare coverage. At that point, the officer in charge of the case can begin to search for information on the delinquent parent by automatically performing tasks such as sending letters to post offices and employers requesting address and salary information. All the data is then stored in a database for future attempts to find the parent. Once the parent is located, the legal workings can be put in motion to generate a court order for him to start paying.

The officers use the system to speed filing and searching procedures. Where officers once had to sort through thousands of paper files, they can now sit at a Bull terminal and search through and retrieve on-line information from the minicomputer. That information can then be used to electronically create letters and fill out required forms, thus saving time that the officers normally spend performing the tasks manually.

One always hopes for a happy ending to these types of stories, but unfortunately there is not one this time. While the new system has made the lives of the case officers easier on a per-case basis, recent changes in federal regulations make it harder to close cases, and a staggered California economy is resulting in more than 70,000 new cases each year.

And that, Kewin said, is too much, though without the new system things would probably be even more unbearable. "I think that we would be in worse shape than we are now," he said.

But he added that ideas are being implemented that may help turn even this high a tide. For example, an imaging system would allow paper to be eliminated entirely. Kewin said his ultimate goal is this: "Automate as much as possible so we can devote as much of the resources as we can into those parts of the process that require individual thought." That may help at least a few more kids.

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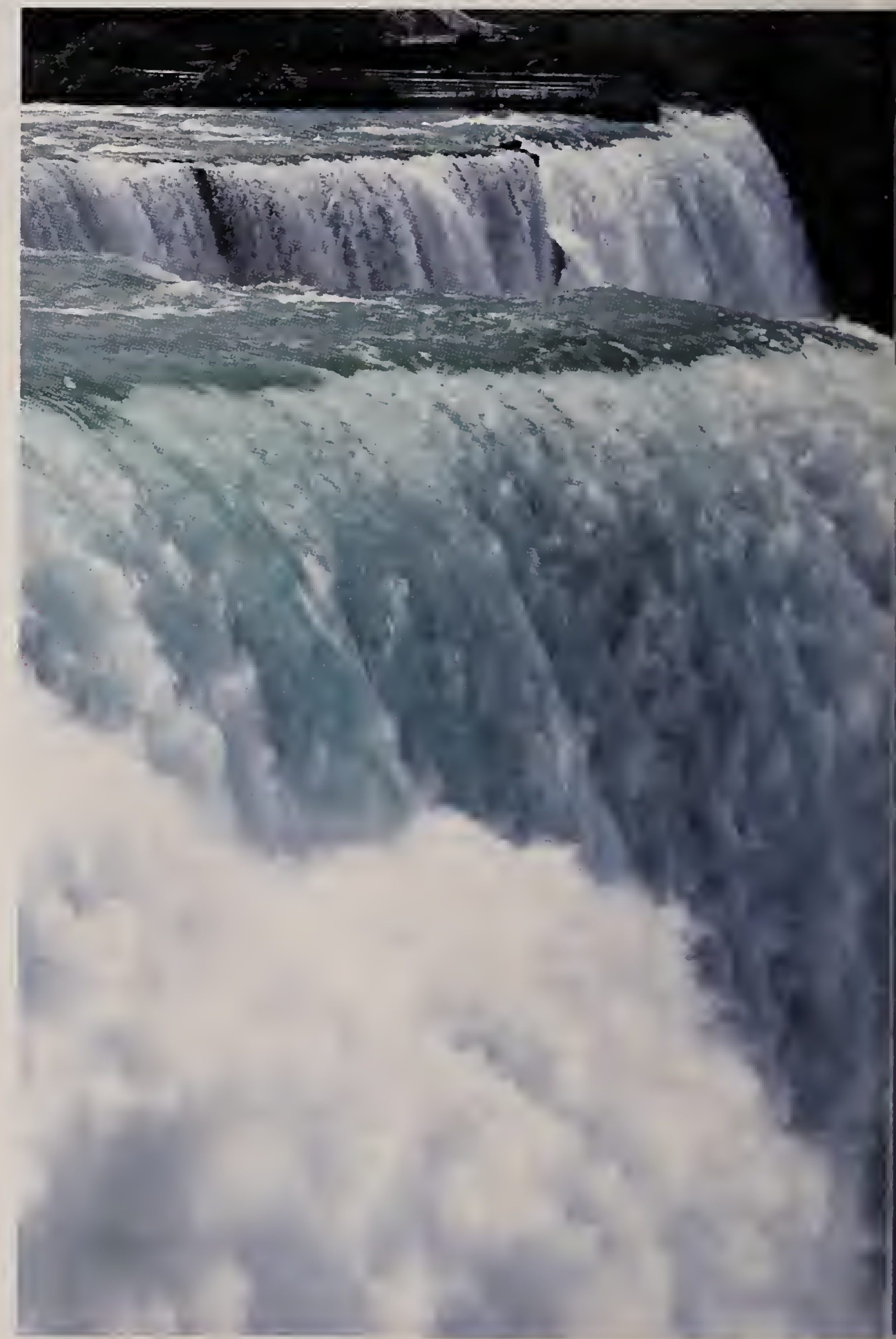

New Products

Power supplies

Computer Power, Inc. has announced the Computersave Mark II uninterruptible power supply (UPS) with the company's new First Alert Remote (FAR) System.

The product is an on-line, single-phase UPS from 900VA to 19000VA, the company reported.

Up to 8 hours of emergency runtime is featured. Line interactive ferroresonant technology is used, and complete isolation is provided from outages and power disturbances.

The FAR System is an optional microprocessor-based device that provides 24-hour unattended monitoring of the Computersave Mark II UPS.

Prices begin at $1,319.

➤*Computer Power*
124 W. Main St.
High Bridge, N.J. 08829
(908) 638-8000

Perma Power Electronics, Inc. has announced a series of standby power systems. According to the company, the systems can back up computers and peripherals if a power failure occurs.

When the power has been rejuvenated, the products have the ability to save, shut down and restore the program.

A "Hibernate" software utility program is included in each full-featured, battery backup uninterruptible power supply system of the new WatchDOS product line. The software detects a signal from the backup power supply when there is an AC line power failure.

Conventional, expanded and extended memory and data to the hard drive is transferred, and then the software shuts the computer down. Three models are available.

Prices start at $299.

➤*Perma Power Electronics*
5601 W. Howard Ave.
Niles, Ill. 60714
(708) 647-9414

Software application packages

Computer Information Systems, Inc. has added Forms Accounting and enhanced Capacity Planning to Version 3.1 of RoboCharge for VMS Data Center Management.

RoboCharge can now track the forms used for various print jobs with support for Forms Accounting. The Capacity Planning capabilities enable RoboCharge to automatically analyze storage, batch, establish usage patterns and project future needs, the company reported.

Pricing is on a per-CPU basis and ranges from $500 to $12,000.

➤*Computer Information Systems*
120 Wells Ave.
Newton, Mass. 02159
(617) 527-1550

SuperWylbur Systems, Inc. has released Version 4.2 of SuperWylbur software for mainframe MVS-based systems.

On-line user manuals and a "hypertext" style access to documentation are provided for easy index of key word access to on-line manuals or tables of contents. Improvements have been made in the Sort command processing for multiple column specifications to operate in ascending and/or descending order and in the Full Screen Panel Support of 3270 terminals, the company reported.

SuperWylbur's base product costs $47,500.

➤*SuperWylbur Systems*
4720 Edgefield Road
Bethesda, Md. 20814
(301) 530-1100

Utilities

USM Corp. has introduced Version 3.0 of Magnifile.

According to the company, Magnifile is the only application maintenance utility for the IBM Application System/400 that offers simultaneous manipulation of two files on screen.

It consists of a file editor, a conversion tool, a spreadsheet-like tool, a query tool, a report generator, a documentation tool and a restoration and retrieval tool.

Magnifile pricing for the AS/400 E series begins at $895 and is comparable for other AS/400 series.

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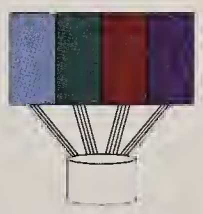

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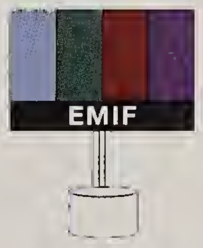

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Application Development

Commentary

Richard Harter

Change control: not just deltas

Perhaps it's because we live in a throwaway society. Perhaps it's because most developers would rather create software than keep track of it. Perhaps it's because most people think of software configuration management (SCM) as another word for maintenance — if they think of it at all.

Whatever the reason, it's fair to say that SCM does not get talked about as much as other areas of the software life cycle, such as design, engineering or code generation. Let's be honest: SCM may be good for you, but like a lot of things that are good for you, it can also be dreadfully boring. And it's hard to advocate good SCM practices without sounding, well, just a bit tedious.

The reaction is partly deserved: For years there wasn't anything new in the way of SCM technology to talk about. SCM was just version control — an automated Rolodex, really. Software releases were files. The trick was to know which version of which file went into which release. That's it. No big deal. To differentiate their products, vendors added pizzazz in different ways — usually by adding a colorful, three-dimensional-looking GUI — and by making the SCM compatible with popular CASE backplanes. When you cut through the wrapping paper, though, what you were left with was still the thrilling process of version control — keeping track of files.

Different kind of control

What's really exciting (and different) is change control. Genuine change control provides a number of nifty features, such as the ability to:

- Move software changes from one development path to another (say, from VAX to Alpha, or from a maintenance path to a new product release path).
- Bundle a number of code changes scattered among various files and operate on them as a unit — for example, moving them (perhaps as a new product feature) across development paths.
- Create, or re-create, any state of the software as a selection of changes, rather than as named versions of files.

You can't do this stuff as long as you are only managing the artifacts of change, rather than the changes themselves. For years, SCM gurus have talked about change as the difference (delta) between two versions of a file.

Deltas are not really changes — at least not

Harter, *page 72*

AI: New name, better game

By Garry Ray

If you are on the fast track with an information systems career, don't breathe a word about expert systems or artificial intelligence. The hot topic of the mid-1980s, AI is now one of the smartest ways imaginable to send your reputation into a tailspin.

But according to users and analysts, a new and improved generation of that same technology — sold under the guise of "business process automation" or "knowledge-based systems" — is accruing gains where nothing else will work.

"People think AI died years ago," said Neena Buck, vice president and director of applied intelligent systems at New Science Associates, Inc., a Westport, Conn., consultancy. Rumors of AI's death are bolstered by "the very negative reactions of people who haven't been exposed to the new technology," Buck added.

But for those who have examined and implemented the revamped development tools and languages, AI — by any name — is paying off.

A six-month development effort at General Mills Restaurants, Inc. in Orlando, Fla., helped reduce food costs by $2 million to $3 million per year, said programmer/analyst Kurt Navratil. Responsible for the operations of more than 600 Red Lobster restaurants in the U.S. and Canada, the firm brought in Knowledge Base Management System (KBMS), a development tool from Palo Alto, Calif.-based Trinzic Corp.

Called the Waste and Inventory Control System, the General Mills application is run monthly to determine whether each restaurant is meeting general guidelines for efficient use of its food inventory. If the amount of "waste" — food lost to spoilage or preparation inefficiencies — exceeds guidelines, the application performs additional inventory analysis to determine which food item might be the source of the problem. Then it generates a set of suggestions from its database for use by the local restaurant manager. The suggestions are forwarded to the local back-office computer at each restaurant. Managers are free to improve on or reject the suggestions made by the application. "You don't want to clamp down so tight that you're adversely affecting your managers," Navratil said.

Yet some applications were designed specifically to adversely affect their subjects.

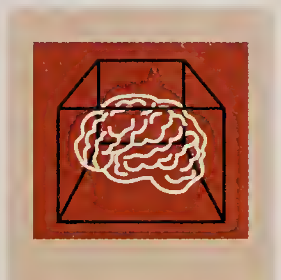
At Toronto's Royal Bank of Canada, a KBMS-based "fraud detection system" now in place for more than a year has reduced credit-card fraud. Although reticent to discuss the specific fraud reductions or the means by which they are achieved, Elo Laugesen, manager of technology products said the application "gives us tools to detect fraud faster and earlier."

Like other developers, Laugesen said knowledge-based applications are easier than more conventional applications to modify and improve, which is important for adjusting to new criminal tactics. "There are always new techniques for defrauding banks," he said. With a knowledge-based system, "we can add changes very rapidly," Laugesen said.

Change is also a keynote at St. Luke's Episcopal Hospital in Houston. The hospital's cardiac catheter laboratory serves more than 50 patients a day, as well as 70 support staff members and 80 cardiologists.

According to Robert Marsh, the hospital's manager of decision support, scheduling the patients, staff and physicians to use equipment, diagnostic rooms and lab facilities had become a nightmare. "We were desperate to alleviate the situation," which required the full-time attention of two managers. "It was difficult recruiting for the position," Marsh added.

After using the KBMS development tools on a research and development basis during a six-month period, Bruce Boley, St. Luke's senior analyst, said the scheduling managers "now spend 15% to 20% of their day answering questions that are managerial in nature."



Knowledge-based application development

Best targets: Departmental business problems currently being solved by company experts and mission-critical problems that require repetitive decision-making.

Roadblocks: According to analysts, bias from the failures and hype of the mid-1980s are the greatest impediments to implementation.

Dominant tool supplier: Trinzic Corp., a Palo Alto, Calif.-based company formed by the 1992 merger of AICorp. and Aion Corp. Estimated by analysts to serve 80% of the knowledge-based tools market with its KBMS, Intellect and Aion DS.

Hospital robots have the Rx for efficiency

By Thomas Hoffman

PITTSBURGH

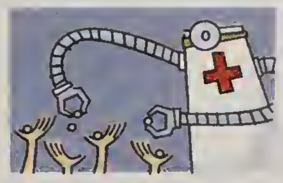
Automated Healthcare, Inc., a task-automation technology provider to the health-care industry, has developed a robot designed to distribute patient medications within hospitals. Though the technology is among the first of its kind, the robot would not be of much use if the company had not developed its own software and application programming interface (API) for links with hospital information systems.

The software driving the robot — called the Automated Pharmacy Station (APS) — is a proprietary package developed by Automated Healthcare and written in C.

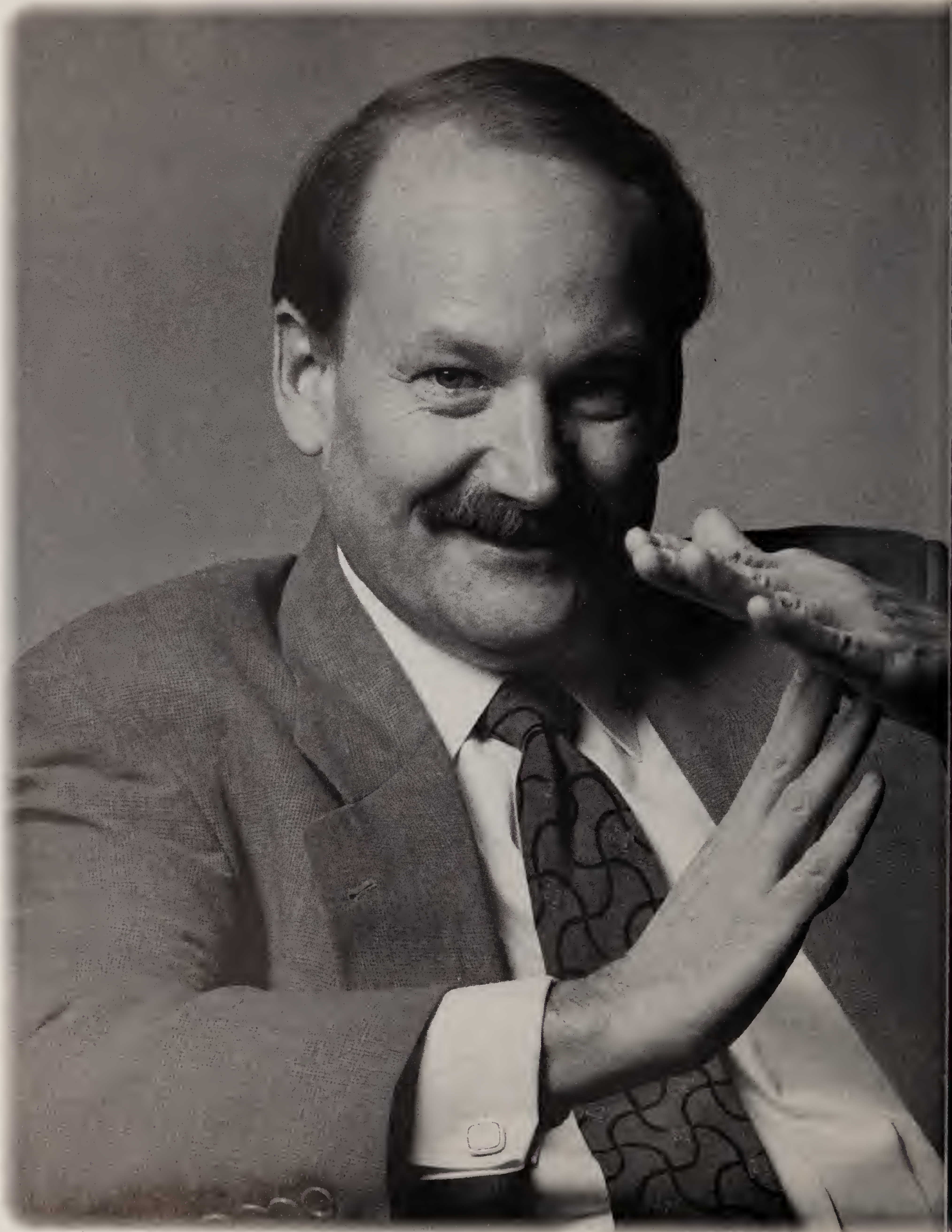
The firm also wrote an API that links the robot's software to a hospital's information system using Computer Associates International, Inc.'s CA-Clipper database engine, according to Aldo Zini, vice president of sales and marketing at Automated Healthcare.

Zini said the APS system comprises robotics components used widely in other industries such as the automotive and textile sectors. Automated Healthcare developed the three-axis robot with a gripper arm that picks up patients' medications from storage cells and delivers them to bar-coded patient bins. The bins are then brought by hospital technicians to the nursing floors, where nurses administer

Robot, *page 72*



APS was developed at University of Pittsburgh's School of Pharmacy, funded in part by the Benjamin Franklin Technology Grant, a fund for Pennsylvania high-tech firms.



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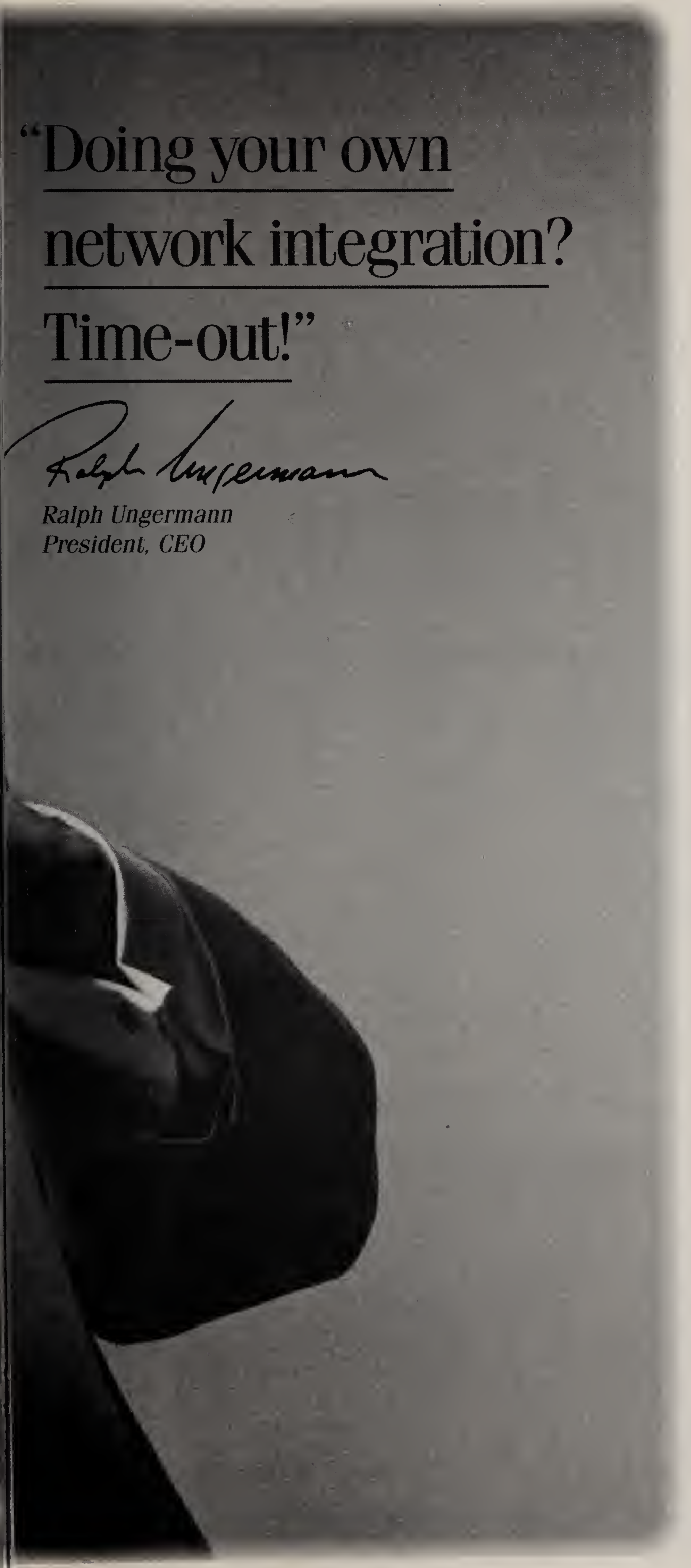
"Doing your own network integration? Time-out!"

Ralph Ungermann

Ralph Ungermann
President, CEO

Most IT professionals tell me they would prefer to work with a strong network integrator rather than buying from many independent product suppliers. And yet, they buy bridges, routers, adapter cards, smart hubs and network management, etc., from dozens of suppliers. Why? Because they equate picking an integrator with having to settle for second rate technology. The only way out is to buy networks in pieces and shoulder the nasty job of integration alone. Time-out! At Ungermann-Bass, we don't think choosing between the "Best of Breed" and "One Stop Shopping" is a choice you should have to make. That's why we're the first networking company to combine leading edge products with leading edge integration. At Ungermann-Bass, network integration is just as important as technology. Now you can have the "Best of Breed" from a single source. If your company would benefit from a business partner who is as obsessed with the performance of your network as it is with product innovation, call Ungermann-Bass at 1-800-777-4LAN.

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Hospital robots

CONTINUED FROM PAGE 69

the medications to patients.

Zini claimed the robots will help hospitals to substantially reduce — if not completely eliminate — the human error rate of medication distribution. "APS will never dispense a wrong medication. A large hospital might dispense 12,000 doses per day. For a human to do that — even if your error rate is 1% — that's still 120 errors a day, which could potentially kill a patient," Zini said.

The robot keeps track of dispensed drugs through an inventory control system built into its software cache. In addition, APS calculates the shortest paths for medication pickup and delivery.

APS has been used for six months at Pittsburgh's St. Claire's Hospital, a 350-bed acute care facility that is also planning to pilot Automated Healthcare's Point-of-Care (POC) systems starting in the first quarter of this year. Zini said Automated Healthcare has also signed contracts to deliver APS to several other health care facilities, including the University of Wisconsin hospital and the Ceton Medical Center in Austin, Texas.

The POC systems, Zini said, use Intel Corp.-based handheld scanning devices from Telxon Corp. in Akron, Ohio, and Nippon Denso, a Japanese handheld manufacturer. Because all of the medications can be bar-coded, Zini said, hospitals could use the POC systems to track and monitor the distribution of medications for administrative purposes.

Zini said Automated Healthcare is developing hardware-independent POC application software that may eventually be used with Grid Systems Corp.'s Gridpads and other emerging desktop technologies. Eventually, Zini said, the company will port the APS system to a client/server distributed database, which he said the company plans to develop with CA.

Harter

CONTINUED FROM PAGE 69

in the way most people think about change. Most people think of change as something you do to make a product different — add a new feature, fix a bug, make the product run on a new operating system. A delta doesn't mean any of these things. Specifically, it's the change made to one file that creates a new version of that file. But who cares? Cutting files up into deltas only saves the disk space required to store complete copies.

A delta is only a change to a file; it may result from several changes to the product, some partial changes or no changes.

If change isn't deltas, neither is it versions. The only reason to track versions is that versions result from changes. The purpose of version control is to build a release from file versions containing the relevant changes. With change control, the changes are identified and manipulated directly. The fact that an enhancement or a bug fix results in several code changes to one file (and perhaps others as well) is a by-product of the logical change — the enhancement or bug fix.

With true change control, we can apply a change to a development path and not drag along irrelevant code just because it is physically adjacent to the altered code. If we want, we can call up a listing of any version of a file, with new or edited lines displayed in bold. We can even call up the name of the change, say NT port, and see all the files, modules, source lines and other physical artifacts affected. Or we can ask the system to build a release with the NT change applied.

Change control is not the same old technology repackaged in a prettier box. Of course, there's nothing wrong with a fine looking GUI, or with an SCM product that attaches to industry backplanes. These are features of virtually every SCM product. There's not even anything wrong with deltas. That's just not where the magic is anymore.

What really sizzles is the ability to replace a collection of physical objects that demonstrate a change with a logical object that defines the change. Now that's something worth talking about!

Harter is founder and chief technology officer of Software Maintenance and Development Systems, Inc., a Concord, Mass.-based maker of software configuration management systems.

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New Products

Application development tools

Crystal Computer Services, Inc. has introduced Version 2.0 of Crystal Reports.

Crystal Reports is a Microsoft Corp. Windows-based data access and reporting tool designed for Paradox, dBase and Btrieve database analysis.

Crystal Reports 2.0 can now access Foxpro 2.0 indices. The two components in the product are an intuitive Report Designer and a Reporting Engine Dynamic Link Library. Version 2.0 offers an enhanced user interface, new data manipulation and report creation features. It also provides access to more corporate data sources. Key features include two-pass reporting, extended user-defined functions and an improved user interface.

Crystal Reports Version 2.0 costs $195.

➤*Crystal Computer Services*
Suite 2200
1050 W. Pender St.
Vancouver, B.C. V6E 3S7
(604) 681-3435

ProtoView Development Corp. has introduced DataTable and ProtoView Screen Management, two Microsoft Corp. Windows-based development tools.

DataTable is a Windows spreadsheet control that offers users both ease of use and advanced data formatting. User-friendly interfaces with data validation for Windows applications are created with ProtoView Screen Management. A library of 12 custom controls is included. Both products require a 286 PC or higher processor running Windows in protected mode. They were designed for Borland International, Inc. Pascal Windows users using object-oriented techniques, the company reported.

The DataTable costs $249.95 or $495 for DataTable with source code. ProtoView costs $395 and/or an additional $199 for the source to the 12 custom controls.

➤*ProtoView Development*
353 Georges Road
Dayton, N.J. 08810
(908) 329-8588

IQ Software Corp. has started shipping IQ Access, a database retrieval and reformatting tool.

Designed for DOS end users, IQ Access selectively retrieves and automatically reformats data stored in application databases for use with Microsoft Corp.'s Excel and Lotus Development Corp.'s 1-2-3, among others, the company said. The tool works with a variety of hardware platforms, file systems and databases.

Pricing begins at $2,500 for a pack of five. Networked versions start at $1,500.

➤*IQ Software*
Suite 550
3295 River Exchange Drive
Norcross, Ga. 30092
(404) 446-8880

Empress Software, Inc. released Version 4.8 of its Empress Relational Database Management System for DOS.

The product is a single-user program that can compile sharable fourth-generation language code. Applications can then be migrated to Unix machines and seamlessly perform in networked, multiplatform environments, the company reported. By screen painting in a what-you-see-is-what-you-get format, a forms generator develops screens or forms with associated data fields.

A series of scripts that control the operations preformed within fields, the display of forms and the assignment of operations to the function keys are contained in an applications generator.

Version 4.8 of the Empress RDBMS for DOS costs $945.

➤*Empress Software*
6401 Golden Triangle Drive
Greenbelt, Md. 20770
(301) 220-1919

Kansmen Corp. announced VBToolsKan Version 1.0, a development tool kit for Microsoft Corp. Windows in Visual Basic.

VBToolsKan consists of seven custom controls: Status bar, Toolbox, 3D Chart, Ribbon/IconBar, Table, Field Validation and Meter Control.

The product is available for an introductory price of $99.

➤*Kansmen*
2080-C1 Walsh Ave.
Santa Clara, Calif. 95050
(408) 988-0634

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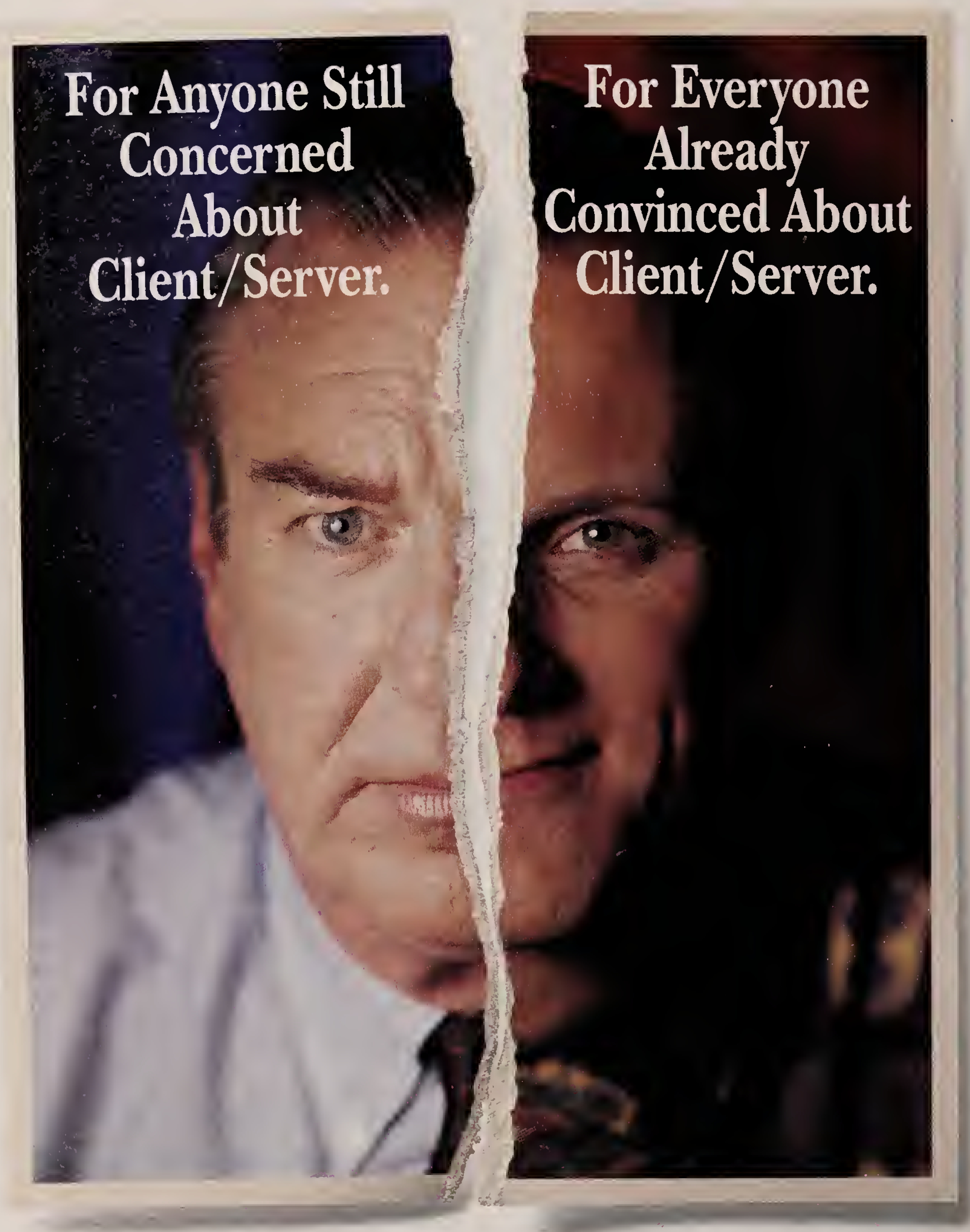
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Basic instinct

Air Force Materiel Command puts the 'user' into user support — one logical step at a time

By Elisabeth Horwitt

About to launch a planned revamp of its communications-computer support organization and systems, Air Force Materiel Command decided to drop in on its bases around the country to get a sense of what users' support priorities really were.

The results of the survey knocked the 14 communications/computer directors back on their heels, according to Maj. Hal Ellis, who is in charge of the customer support project.

MICHAEL WILSON

Maj. Hal Ellis: *'We thought we knew what users wanted'*

"We thought we knew what users wanted," Ellis says. "We had good intentions, but we were all focusing on the internal processes, on buying the right product to make it easier for IS managers to do the job," such as sophisticated network management software with a graphical user interface.

Users had a different agenda.

"They wanted an instant connection to the data; and when there was a problem, they wanted one source, one phone call, to get it solved," Ellis says.

Inside

The limits of IS/business 'team:' Uh oh, does this mean there are some? IS organizational consultant N. Dean Meyer suggests entrepreneurship as a better model for IS professionals. **Page 79.**

Users interviewed during the survey made it clear that the information systems group was not meeting those needs, Ellis reports.

For example, users at one parts warehouse were finding that sometimes a crucial part is missing even when the computer says it is on the shelves. "I asked the guy, 'Do you call the help desk [when this happens], and he said, 'Hell no, I need a part, not a trouble ticket,' " Ellis says.

Users said they prefer to call a local programmer rather than the help desk, which they perceive as being out of touch with what is really going on with their systems, Ellis says.

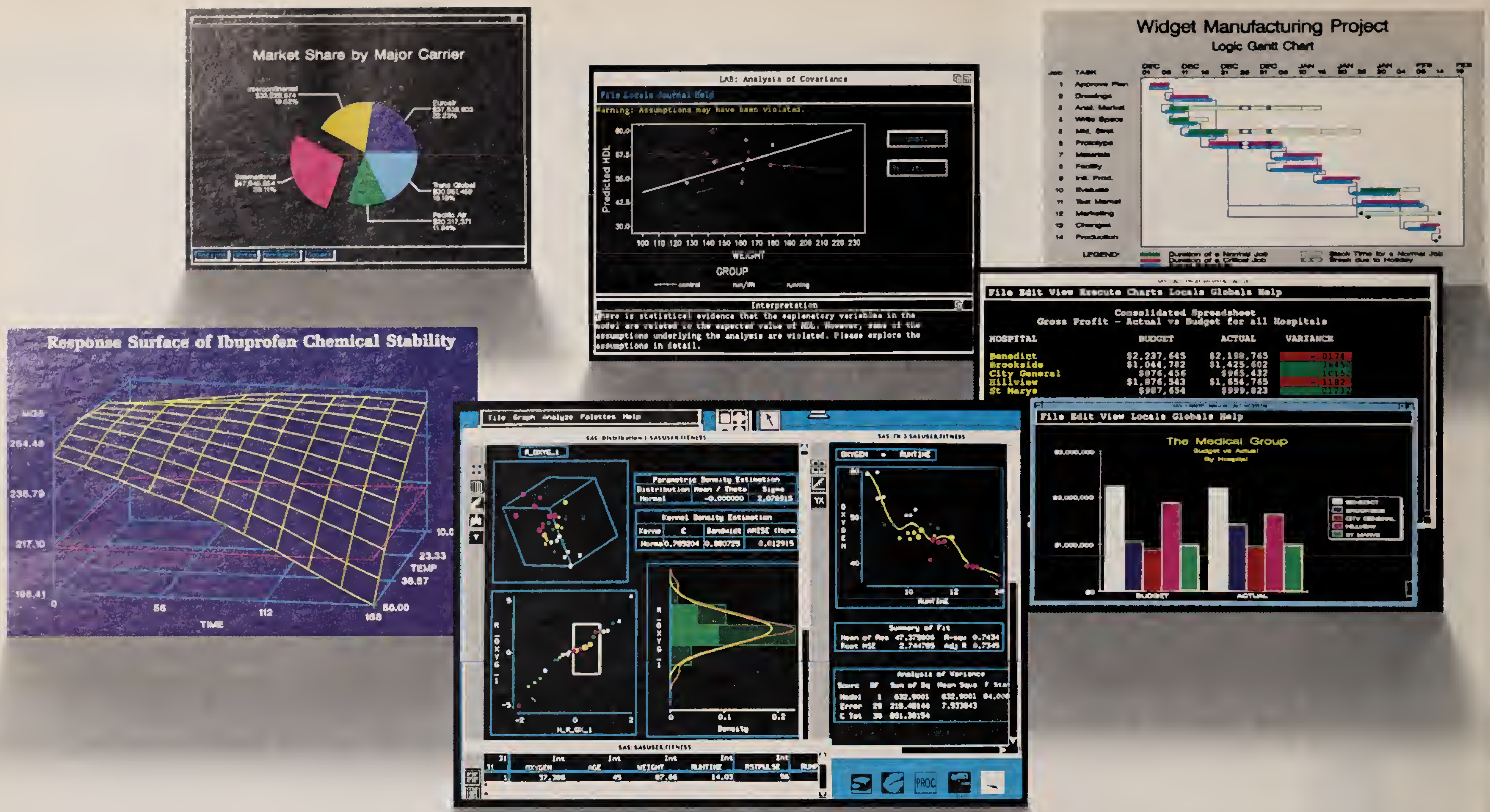
The overall message the surveyors took back to communications/computer directors was clear, according to Ellis: "We have help desks that are very good at tracking and logging problems, but they were not getting the parts out any faster."

Led by Ellis, the project team put together a strategy for flipping these priorities around: to focus on serving the command's "core business functions — which is procuring, deploying and maintaining weapons systems for the Air Force," Ellis says.

Plotting a solution

After the survey results were presented at a Network Management Summit held at Tinker Air Force Base last April, directors and their entourages broke up into workgroups and hammered out what Ellis described as a "Rubik's cube." It laid out network management tasks, such as performance and problem management, on one axis; network management

User support, *page 77*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Air Force puts 'user' into user support

CONTINUED FROM PAGE 75

facilities, such as the help desk, and a network monitoring system, on a second axis; and various command business functions that need to be supported along a third.

"We didn't look at specific products; we just said, 'This is what we need to do to support our users' " in the basic areas of accounting, configuration, performance and fault management, says Dirschl Lacy, general manager in charge of Air Force accounts at SSDS, Inc., a systems integrator based in Englewood, Colo., and a primary contractor for the customer service center project.

"The goal was to get a common mechanism of user support to apply across all sites," Lacy says.

The six-month survey uncovered plenty of room for improvement, Lacy says. For example, "We found it was not uncommon for people to do without a printer for a couple of weeks" because the standard Air Force contract requires a vendor to initially respond to a trouble call within two hours but places no time limit on actually fixing a problem, Lacy says.

Materiel Command hopes to have its "generic customer service center" in place at each base by October 1993, Ellis says. The centers will work to incorporate the following goals, which were arrived at during the conference:

- A centralized network support center whose staff has access to all the expertise, tools and systems needed for effective user support. Currently, these resources tend to be scattered around each base, Ellis says.
- A methodology for the help desk to use in responding to user trouble calls. Keeping users apprised of actions taken to correct a problem.
- More active troubleshooting. "Right now, we do postmortem network management," finding out about a problem only when the complaints start coming in, Ellis says.
- Some degree of product commonality of systems, with the long-term goal of migrating to Open Systems Interconnect-based network management.

The ball is now in the court of the various bases' communications/computer directors, some of whom have already begun to implement more customer-oriented communications/computer support, Ellis says.

So far, so good, according to one of the folks in charge of spearheading the next step. The summit "did bring the idea of customer support to the forefront," said Paul Lucena, chief of the data communications support branch at McClellan Air Force Base.

"It got a commandwide consensus that this is the way to do business," Lucena says.

Users have spoken: It's SNMP

A recent survey of 438 network managers at companies with annual sales of more than $100 million showed that the Simple Network Management Protocol (SNMP) has displaced IBM's SystemView as the most popular choice for network management

	Percent currently use	Percent plan to use
SNMP	40%	20%
None	22%	11%
No answer	20%	50%
IBM's SystemView	13%	7%
OSI management (CMIP, CMOT, CMOL protocols)	6%	11%
Other	6%	3%
OSF's Distributed Management Environment	4%	8%
Government Network Management Profile	1%	2%

Source: Datapro Research Group

By the book

Maj. Hal Ellis is heading up Air Force Materiel Command's computer support revamping project, and he is doing it by the book. Ellis said he got one of his pivotal strategic tips primarily from reading Elijuh Goldratt's *The Goal.* Goldratt's thesis is that an organization should focus on its throughput, "whatever that is," Ellis says. "For a for-profit company, that would be profit." Ellis' group defined throughput for IS customer services as client connectivity. "At the same time, we want to decrease operating expense and inventory."

McClellan A. F. Base : The first to fly

Materiel Command's support help staff of 20 personnel is responsible for keeping about 13,000 users smiling, with a goal of resolving 75% of the calls immediately.

Last April, when Air Force Materiel Command's communications/computer directors officially decided to put the "user" back into its user support systems, McClellan Air Force Base's IS department was already several months into a project to do just that, according to Paul Lucena, the Sacramento, Calif., base's chief of data communications support branch.

As a result, McClellan has been one of the first bases of the Materiel Command to come up with "a true, merged customer support help desk [organization] that provides a single point [for users who] come to us with a problem, a question, a requirement" related to computers or networking, Lucena says.

The goal for the 20-person staff, which supports a user population of 13,000, is to have 75% of all telephone calls resolved as they come in, Lucena says. That goal is still a ways off. However, the group has gotten significantly better at "tracking the problem and getting the right people out there" to solve it, he adds.

Instead of calling a succession of contractors, each of whom would say "it's not my equipment," support people now go to the site, fix basic problems such as a broken wire or an unplugged terminal and direct the more specialized problems to the right contractor, Lucena says.

At least as important from a customer satisfaction perspective, support personnel do not leave users guessing what, if anything, is being done to fix a problem, Lucena says. "Just knowing what steps are being taken gives users that warm fuzzy that someone is working on the problem."

Early this month, Lucena's staff got direct proof that they are moving in the right direction, from the results of a survey that so far has pulled in 374 responses from the user community, he reports.

Results so far appear encouraging:

- 93.5% of the survey respondents said the problem was resolved to their satisfaction.
- Of those whose problems were not resolved immediately, 93.2% said they were told what to expect.
- 95% reported that support people responded in a day or less.

"Our ultimate goal is response — not necessarily resolution — within two hours," Lucena says.

Prior to the customer support revamp, "I'd estimate that we were looking at 30% customer dissatisfaction because before, there was no way to monitor and track problems or know where to take problems we couldn't solve," Lucena said.

And especially, there was little ongoing communication with users. "We find most users can live with problems if they know someone's working on them. The malcontents and bad vibes come when they think nobody cares," Lucena said. —*Elisabeth Horwitt*

A recent survey of their clients revealed that user confidence is on the uptick: 95% reported that support staff responded within a day or less.

Executive Track

Mark A. Pugliese has been named information systems manager at the **National Newspaper Association's** wholly owned advertising subsidiary, **American Newspaper Representatives, Inc.** (ANR). Before joining Minneapolis-based ANR, IS veteran Pugliese, who earlier served as business systems manager at Radisson Hotels, spent a year as an independent consultant.

Former Coopers & Lybrand IS consulting partners **James W. Kunz** and **John K. Leigh** are trying a partnership of a different kind these days: The two have started their own systems integration and IS consulting firm — **Kunz, Leigh & Associates** — in Lathrup Village, Mich. Kunz previously headed up Coopers & Lybrand's IS consulting practice in Minneapolis. Leigh served in the same capacity at the accounting and consulting firm's Cleveland office. Their new venture will focus on systems integration and software development in distributed and networked environments.

Stan Lippian is the new director of MIS at the Cleveland-based law firm of **Hahn Loeser & Parks**. In his new role, Lippian will be responsible for the management and development of systems applications.

George E. Coe has been named senior vice president in charge of the Automation Services Department at the **Federal Reserve Bank of Chicago**. Coe, a 32-year veteran of the Federal Reserve System, will continue to serve as senior officer in charge of the System's Network Management Control Center, also located at the Chicago Fed.

Have you or a colleague in IS recently been promoted? *Computerworld* would like to share your news with the rest of the IS community. Please contact associate editor Carol Hildebrand at (800) 343-6474 to pass the news along.

Commentary

N. Dean Meyer

Business in a business?

For years, I've seen IS as a "business within a business." So I was shocked to meet users who thought that was a bad idea.

In their company, it seems, IS has historically not been customer-focused. For them, the business-within-a-business (BWB) culture evoked images of a staff department living in its own world, not aligned with their strategies and not part of their management team. As they saw it, the BWB concept was a view of IS as an end unto itself, rather than as a means to help the users do their business.

Instead, these users felt that IS should consider itself merely a part of their business team. Indeed, they were tempted to recommend decentralization of the corporate IS department to ensure that the IS staff understood they must serve the needs of their users.

This attitude demonstrates a deep misunderstanding of the BWB concept. Customer focus, business-driven innovation, commitment to clients' success and effective partnerships — the makings of strategic alignment — are exactly the reasons for pursuing a BWB culture.

Two key objectives may seem paradoxical at first blush: Client partnership and strategic alignment seem to require decentralization. High quality, low cost, integrated architecture and professionalism seem to require centralization.

Getting it all

But you can have the best of both. Note that you don't need to own your own grocery store to control what you eat. Your control is as absolute as a customer in an entrepreneurial market. And you get the benefit of professional shopkeepers buying goods, tracking inventories and managing the store. Similarly, in a BWB culture, clients have control over business decisions — what gets done, for whom and when — without having to manage their own IS groups.

Thinking of yourself as a business within a business means thinking like an entrepreneur. In contrast, members of somebody else's team leave the entrepreneurship to the boss. Decentralized staff may be entrepreneurial about the users' business, but this is doing the users' jobs for them and not adding unique value to the team.

Successful entrepreneurs know that the only way to earn market share is to satisfy their clients. Entrepreneurs don't tell people what to buy or force generic solutions on them; they listen to their clients and tailor solutions to satisfy their most pressing strategic needs. They don't antagonize their clients by claiming monopolistic power; they earn market share by being "best of breed."

Entrepreneurs don't attempt to restrict or police their clients. They don't spend a lot of money building systems because they think they know what's best for their clients. They say, "No customer, no work!"

Entrepreneurs are creative; they continually seek new ways to better serve their clients. On the other hand, "team members" just do what they're told.

Entrepreneurs are professional; they understand the IS business and produce high-quality solutions because IS is their livelihood.

"Team members" are likely to see their career paths as out into the business. They typically seek to replicate the skills of their clients, rather than complement them with ideas that spring uniquely from the IS perspective.

Entrepreneurs are competitive. They keep up with developments in their field to stay ahead of the competition.

In contrast, decentralization leads to many small IS groups that are by necessity generalists — "jacks of all trades, masters of none." As such, they cannot keep up with the whirlwind pace of technological change, and the pace of innovation slows accordingly.

Quality suffers as generalists muddle their way through new technological frontiers. Lucrative opportunities may be lost when generalists are unaware of emerging technologies. Costs rise as efforts are replicated and architecture becomes fragmented. The bottom line: In my experience, decentralized IS head count may be as much as 50% above the norm.

Finding the problem

The moral of the story: if you have a problem with culture (e.g., a lack of customer focus), don't seek a quick fix in a restructuring. Get to the root cause: Fix the culture by cultivating a BWB perspective.

True, decentralization may be easier in the short term. To build an effective BWB culture takes more than executive rhetoric. It may require adjustments to the IS department's structure, budgeting and priority-setting processes, methods and rewards. And it will take time. But it can be done.

Meyer is president of NDMA, Inc., an IS consultancy in Ridgefield, Conn.

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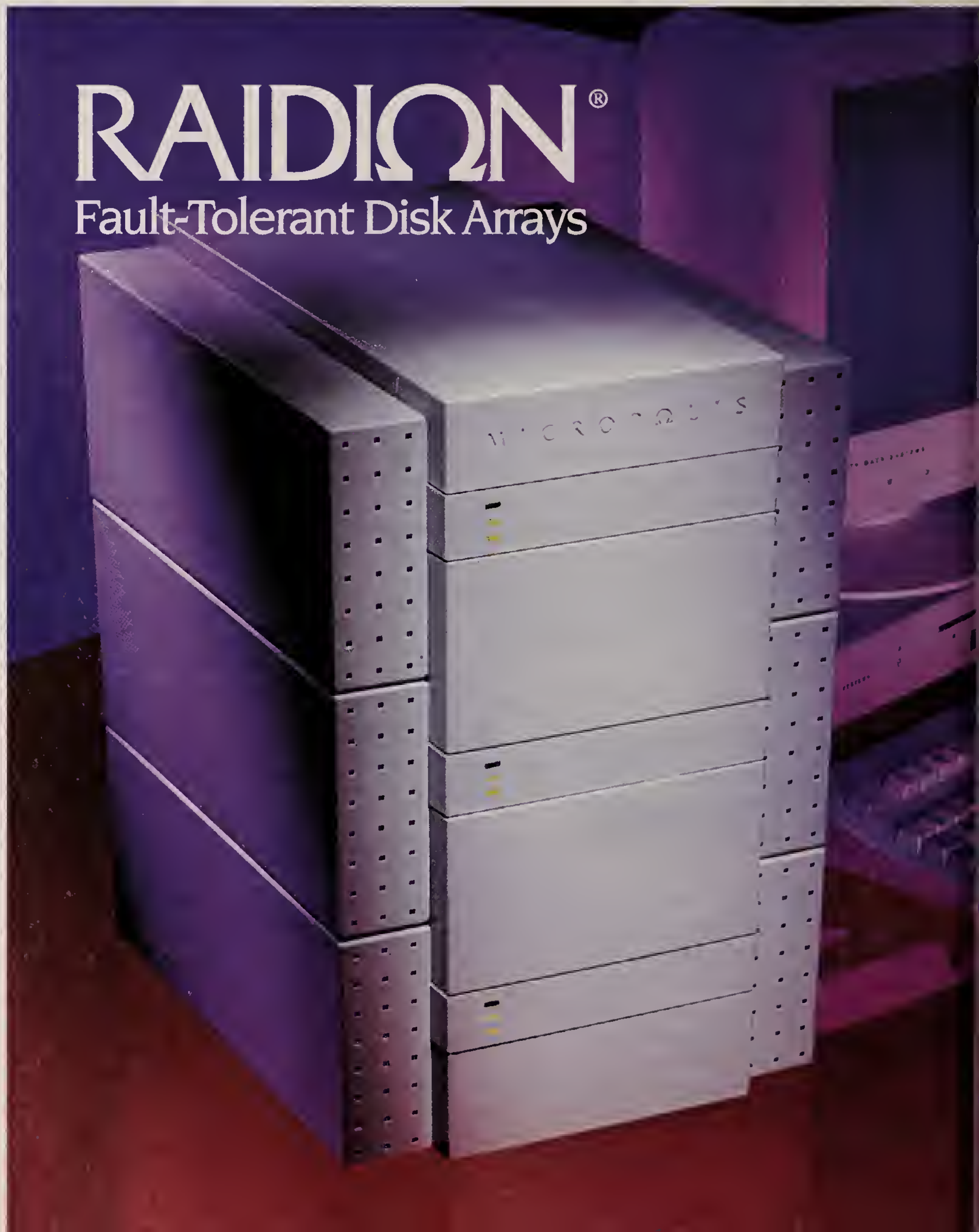


Calendar

JAN. 24 - JAN. 30

Marketing the IS Organization Internally. Atlanta, Jan. 26-27 — Contact: Oullette & Associates Consulting, Inc., Bedford, N.H. (603) 623-7373.

JAN. 31 - FEB. 6

Downsizing Corporate Information Systems Conference. London, Feb. 1-2 — Contact: Amanda Stuart, IBC Technical Services Ltd., London, England 011-071-637-4383.

Object World. Boston, Feb. 1-4 — Contact: Lynn Fullerton, World Expo Corp., Framingham, Mass. (508) 879-6700.

Image World West. San Jose, Calif., Feb. 1-5 — Contact: Benita Roumanis, Knowledge Industry Publications, Inc., White Plains, N.Y. (914) 328-9157.

Comnet. Washington, D.C., Feb. 2-4 — Contact: World Expo Corp., Framingham, Mass. (508) 879-6700.

FEB. 7 - FEB. 13

1993 User Data Management Systems User Conference. Keystone, Colo., Feb. 7-10 — Contact: Rebecca Campbell, Interactive Software, Keystone, Colo. (303) 987-1001.

Document and Image Management Systems Conference. Lake Buena Vista, Fla., Feb. 7-10 — Contact: BIS Strategic Decisions, Norwell, Mass. (617) 982-9500.

Managing Enterprise Networks Conference. San Francisco, Feb. 8-10 — Contact: Digital Consulting, Inc., Andover, Mass. (508) 470-3870.

Expo Comm Mexico '93. Mexico, Feb. 9-12 — Contact: Ben Stauffer, E. J. Krause & Associates, Inc., Bethesda, Md. (301) 986-7800.

FEB. 14 - FEB. 20

1993 Symposium on Applied Computing. Indianapolis, Feb. 14-16 — Contact: Association for Computing Machinery, New York, N.Y. (212) 869-7440.

Western Communications Forum '93. Phoenix, Feb. 15-17 — Contact: Western Communications Forum, Chicago, Ill. (312) 938-3500.

Mobile '93 Conference and Trade Show. San Jose, Calif., Feb. 16-18 — Contact: Technologic Partners, Larkspur, Calif. (415) 924-1274.

Distribution/Computer Expo '93 West. Anaheim, Calif., Feb. 17-18 — Contact: C. S. Report, Uwchland, Pa. (215) 458-6410.

FEB. 21 - FEB. 27

SynOptics Users Group Conference. Monterey, Calif., Feb. 21-24 — Contact: SynOptics Users Group, Santa Clara, Calif. (408) 988-2400.

1993 Government Imaging Conference and Exposition. Bethesda, Md., Feb. 23-26 — Contact: USPDI, Silver Spring, Md. (301) 445-4405.

Compcon Spring '93. San Francisco, Feb. 22-26 — Contact: John Barr, Motorola, Inc., Rolling Meadows, Ill. (708) 576-8706.

Software Development '93. Santa Clara, Calif., Feb. 22-26 — Contact: Miller Freeman, Inc., San Francisco, Calif. (415) 905-2741.

Planning for Integrated Information Systems. Orlando, Fla., Feb. 24-25 — Contact: Barnett Data Systems, Rockville, Md. (301) 762-1288.

Seventh Annual Users Conference. Salt Lake City, Feb. 24-26 — Contact: Wasatch Computer Technology, Salt Lake City, Utah (801) 575-8043.

The 1993 Prepublishing Conference and Exhibition. Feb. 24-27 — Contact: Graphics Arts Show Co., Reston, Va. (703) 264-7208.

"Doing Business in the Pacific Rim" International Conference. Sydney, Australia, Feb. 25-26 — Contact: Computer Law Association, Fairfax, Va. (703) 560-7747.

FEB. 28 - MARCH 6

Advanced Object-Oriented Analysis and Design: The State of the Art. San Diego, March 1-4 — Contact: Barnett Data Systems, Rockville, Md. (301) 762-1288.

Sensors Expo West 1993. San Jose, Calif., March 2-4 — Contact: Expocon Management Associates, Inc., Trumbull, Conn. (203) 374-1411.

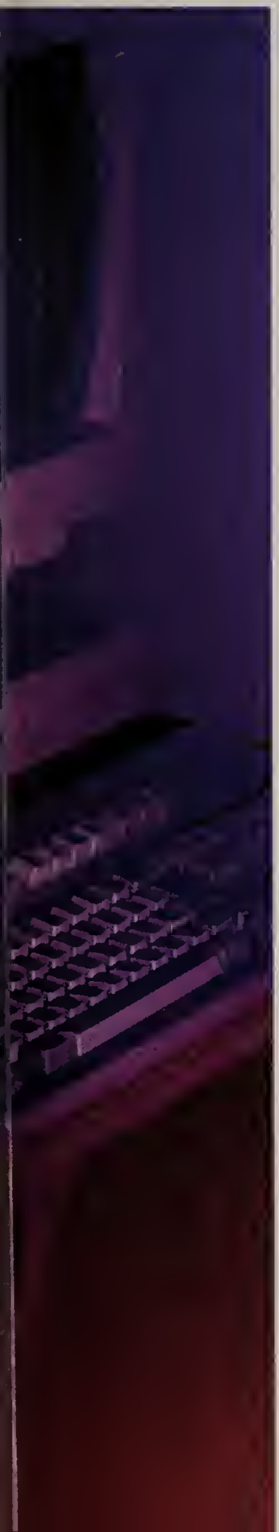
MARCH 7 - MARCH 13

Geographic Information Systems in Business '93 Conference (GIS). Boston, March 7-10 — Contact: GIS World, Fort Collins, Colo. (303) 223-4848.

First Workshop on Object-Oriented Design '93. Snowbird, Utah, March 8-10 — Contact: Object-Oriented Software Engineering, Brookfield, Wis. (414) 789-5258.

MARCH 14 - MARCH 20

National Automated Clearing House Association Conference (NACHA). San Diego, March 14-17 — Contact: NACHA, Herndon, Va. (703) 742-9190.



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LAN "The Raidion array had the most thorough documentation of the tested drives. The Raidion software was the most robust, as well." June, 1992

PC WEEK "PC Week Labs found that the array performed admirably - successfully backing up data and easily restoring it upon drive failure." May 25, 1992

BYTE "The Raidion's low price alone makes it worth considering." August, 1992

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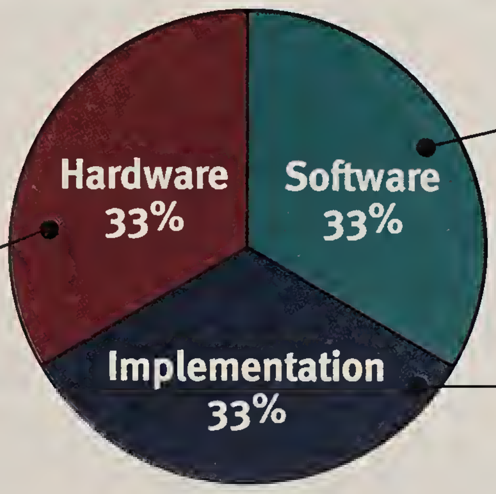
The CW Guide to Network Storage

It's a puzzle with MISSING PIECES

Nevertheless, you can start piecing together an effective system



The software is 60% to 70% available and operable.

The hardware is 100% available and cost-effective.

Implementation is only 30% to 40% successful. Politics, chaos, disorganization are major problems.

By Lee Elizer

Ask anyone who has begun the task of controlling storage on distributed local-area networks — it's likely one of the most involved projects you will undertake in your information systems career.

Consider: How many different tape technologies are currently in use within your company? How many on the same network? Often, the answer is more than one, and quite often, it's as many as three. Does the same software manage all three tape technologies in use? Usually not.

The fact is, most network storage management strategies are based on such a piecemeal approach. This is, in part, because of the stand-alone nature of storage management components that have been developed and sold by a variety of companies. But what's really missing in most companies' network storage management strategies is the strategy.

Because of the way LANs have grown up in most companies, network storage management is accomplished department by department rather than in a centralized fashion. Now that mission-critical data is on those LANs, many large companies are starting to feel that centralized control is the best way to guarantee corporate data security and data integrity.

Not to mention that decentralized control requires a huge amount of manual effort. According to Sterling Software, Inc., which supplies large-system storage management software, one major U.S. corporation with more than 35,000 PCs estimates that the equivalent of 600 full-time people is required just to manage distributed storage resources.

Missing pieces, *page 85*

INSIDE

RAID ratings
page 82.

Backup vendors
page 86.

User view
page 86.

NCR's RAID
page 89.

Network Storage

Buyers' Scorecard: Compaq, Dell share top scores in PC-LAN server survey

By Derek Slater

Redundant arrays of inexpensive disks (RAID) storage technology is seeping onto users' local-area networks. In a Buyers' Scorecard satisfaction poll of PC LAN sites using servers with RAID support, Compaq Computer Corp. and Dell Computer Corp. finished neck and neck.

Compaq's SystemPro and Dell's PowerLine servers earned overall scores of 83. Tricord Systems, Inc.'s PowerFrame superserver followed closely at 81.

RAID is not for those with thin wallets. Because of the relative newness of the technology, RAID systems generally carry a premium price tag. However, users who have implemented RAID on PC LANs rated cost issues as the least of their concerns. Their key concern is to purchase a reliable, fault-tolerant system with no compatibility glitches.

In general, users said that their RAID-equipped servers were suitably reliable but too proprietary and hindered by poor availability of parts and compatible disk drives. Increased storage capacity was also cited as a commonly desired improvement for the systems.

The response base reflects the relatively low penetration of RAID units into the LAN server market. SystemPro has been available the longest and leads in market share. As with the Dell PowerLine, the built-in RAID subsystem is an option for the SystemPro. The latest SystemPro/XL array is based on Small Computer Systems Interface-2 (SCSI-2) technology and supports RAID Level 1 (disk mirroring), Level 4 and Level 5 (which both protect data through the use of parity drives).

Users indicated compatibility with installed hardware and software as a key strength of the SystemPro and also gave it the highest rating in quality of vendor support. It lagged behind in overall performance.

Users also noted some difficulties in obtaining replacement parts for the Compaq system, although it still rated above the Tricord server in that area.

Compaq and Dell have announced a stream of product upgrades in their efforts to outdo each other in storage capacity and performance. Dell's latest subsystem, based on SCSI-2 technology, offers up to 8.4G bytes of internal storage. The Dell SCSI Array supports RAID Level 0 (data striping across multiple disks) and Level 1, with support for additional levels of RAID planned for this year. In the survey, Dell's servers earned the highest score in responsiveness of vendor service but lagged behind in reliabilty and fault tolerance.

The Tricord system supports RAID storage configurations through its PowerRAID option (a capability that can be added to its I/O processor), but it does not include a built-in RAID subsystem. PowerFrame supports RAID Levels 0 and 1 or a combination of the two, plus "hot sparing" (replacing a disk drive while leaving the system up and running).

Because of its higher processing power and cost, the PowerFrame superserver is best suited for larger networks. However, the PowerFrame does support a number of PC platform standards, such as Extended Industry Standard Architecture connections, SCSI drives and Intel Corp.-compatible software. The PowerFrame supports Microsoft Corp.'s LAN Manager and Banyan Systems, Inc.'s Vines LAN operating systems, in addition to Novell, Inc.'s NetWare.

Users of Tricord's PowerFrame gave it higher satisfaction ratings than the Dell and Compaq products earned in many of the key areas. •

LAN servers with RAID

Total scores reflect average user ratings for all measured areas, weighted by user-assigned importance. Response base: 30 users for Compaq, 14 users for Dell and 12 users for Tricord.

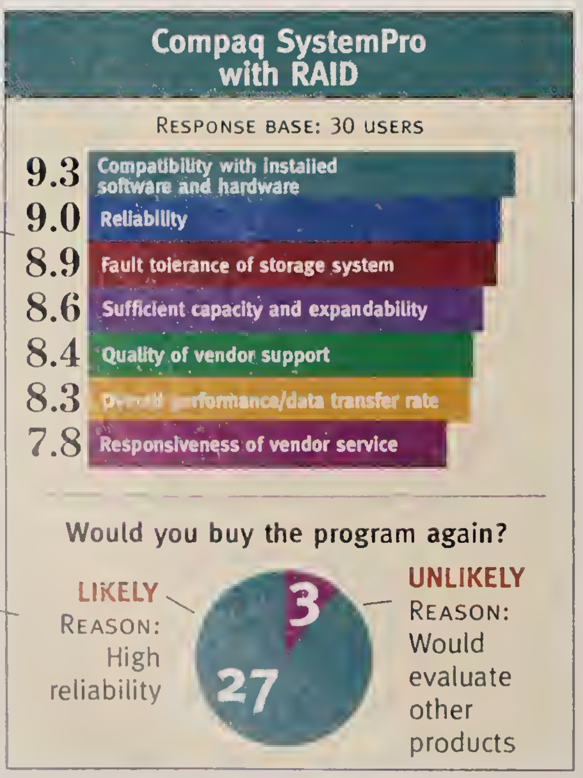
TOTAL POSSIBLE SCORE 100

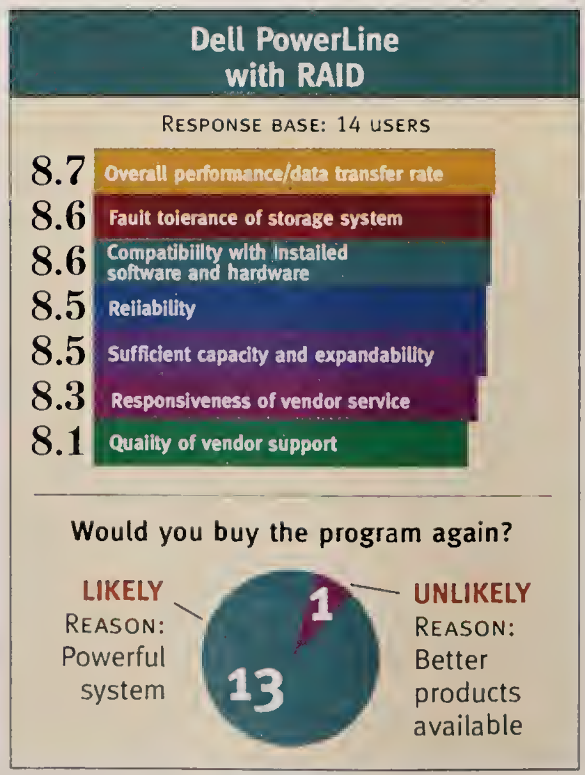
MEAN SCORE 82

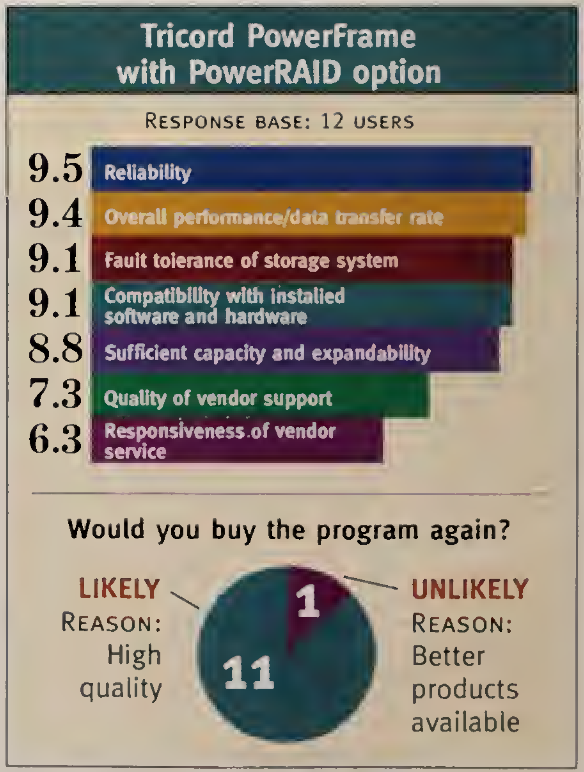
PRODUCT		PROS	CONS
Compaq's SystemPro with RAID	SCORE 83	"IT RUNS RELATIVELY SMOOTH AND FAST, WITH HARDLY ANY DOWNTIME."	"HAVE TO USE PROPRIETARY DRIVE-MOUNTING TECHNIQUES."
Dell's PowerLine with RAID	SCORE 83	"THE PRICE/ PERFORMANCE RATIO IS PRETTY OUTSTANDING."	"MANY PARTS CAN'T BE PURCHASED FROM ANY OTHER VENDORS."
Tricord's PowerFrame with RAID	SCORE 81	"PERFORMANCE — THE DISK CONTROLLER IS ON A SEPARATE HIGH-SPEED BUS."	"IT'S VERY EXPENSIVE." "SPARE PARTS AVAILABILITY."

Ratings are based on a 1-to-10 scale, where 10 is best.

Reasons are based on the most frequently stated answers.


Compaq SystemPro with RAID


Dell PowerLine with RAID


Tricord PowerFrame with PowerRAID option

Network Storage

METHODOLOGY

User names were obtained from vendor and nonvendor sources. First Market Research Corp., an independent market research company in Austin, Texas, conducted the survey. The response base was 30 users for Compaq Computer Corp., 14 users for Dell Computer Corp. and 12 users for Tricord Systems, Inc.

Users rated their satisfaction with their installed products and were not asked to compare or rate one product directly against another in the Scorecard.

To compute the overall score for each product, perform the following steps:

1) Multiply the product's score in the first category by the user importance rating to obtain the weighted score.

2) Repeat the process for all remaining categories.

3) Average the resulting figures for the average weighted score.

4) Convert the average weighted score to base 100.

The ratio of the average weighted score to the average user importance is equal to the ratio of the overall score to 10.

ACKNOWLEDGMENTS

Computerworld thanks the following for their assistance with this Buyers' Scorecard: *Computerworld* Database Division; Lee Elizer, Data Storage Concepts.

Ratings in order of importance

9.8	Reliability
9.1	Fault tolerance of storage system
9.0	Compatibility with installed software and hardware
8.9	Sufficient capacity and expandability
8.5	Responsiveness of vendor service
8.3	Quality of vendor support
8.3	Overall performance/data transfer rate
8.3	Availability of compatible drives and parts
7.8	Documentation
7.5	Ease of migration from other storage systems
7.3	Ease of installation and operation
7.1	Acquisition and maintenance costs
6.8	Cost per megabyte of storage

Vital statistics

What is your position?	
CIO/VP/IS director	6
IS manager	12
Network/LAN administrator	13
Operations manager	1
Systems analyst	4
Other	20

What is your responsibility for LAN servers with RAID?	
Evaluate or recommend vendors	50
Determine need	47
Select vendors	44
Set standards for your organization	42

Response base: 56

Storage specs

Compaqs RAID subsystem is strictly internal; Tricord supports only external arrays; and Dell allows either configuration

	RAID levels	Maximum capacity	Price
Compaq IDA-2	1, 4, 5	4G bytes (internal)	$2,030 for controller
Dell DSA	0, 1	8.4G bytes (internal) 58.8G bytes (with multiple controllers)	$3,255 for controller
Tricord PowerRAID	0, 1	45G bytes	RAID support bundled with all systems as of Jan. 11

What RAID is — and what it is not

By Lee Elizer

RAID certainly has its place in storage management, but it's not the cure-all that some vendors crack it up to be.

RAID, or redundant arrays of inexpensive disks, describes a group of 5- or 3-in. disks linked to provide the following:

- A faster transfer rate by transferring data from all disks simultaneously.
- A faster average access time to individual data files because they are spread under more read/write actuators than a single, large-capacity disk.

Because RAID subsystems are, by definition, faster than single, fixed-disk subsystems, they should be used as a primary storage device. Also, most RAIDs are implemented transparently to application systems, reinforcing them as a primary storage device.

Here are some reasons why RAID subsystems will never substantially replace tape drives and tape libraries:

- Tape is used for high-capacity interchange. You can move data from one system to another by physically interchanging the recorded media. This is also true for automated data libraries (ADL).

Data interchange is not feasible with the recorded disks in a RAID system.

- Tape is used as an off-site backup medium because it's portable and inexpensive. In case of a disaster, data and system software must be recreated on either the same site or a different one. But RAID must recreate its data based on what remains in the RAID subsystem.

All RAIDs require tape backup because of disaster protection requirements.

- Compared with RAID disks, tape is a substantially less expensive medium on a per-megabyte basis. Tape ADLs provide huge, economical capacities for online storage. RAID cannot match these capacities on a cost-effective basis.

RAIDs are capacity-limited on an absolute basis and not cost-effective on a relative basis, compared with tape drives and ADLs.

- Technology improvements continue to occur in a variety of tape media. Some individual tape media may lag technologically, but others tend to make them obsolete. RAID, on the other hand, is limited to improvements in basic, disk-drive-capacity technologies. Because of technology factors, the rate of potential, absolute-capacity improvement is greater on tape than disk.

Tape should always retain an edge in capacity growth vs. RAIDs.

Quick. Think of a company with a much broader line of business UNIX computers than IBM.

Network Storage

The piecemeal approach

By Lee Elizer

Network storage management has always existed — just not as efficiently as one would like, and while mainframe concepts are rapidly being transported to the local-area network level, products still operate in piecemeal fashion.

In its earliest and most basic form, storage management consists of data backup software running on a stand-alone PC. At the next level, many PCs are attached to the network, and data backup software runs on the server with the network operating system software.

In a configuration that some say is more sophisticated, you can put backup packages not on the server but on a dedicated tape station. The software collects data throughout the network and backs it up on the dedicated tape station.

A separate concern from backup is keeping data optimally accessible to users without just purchasing more primary storage hardware. This is known as "hierarchical storage management," where software residing on a dedicated network station scans all the disks on the network and automatically migrates needed data to those disks.

But what we'd really like is an umbrella system that controls all those things. This is likely to occur through vendor alliances and new product developments on LAN-based products. In the meantime, here's a closer look at the techniques companies are using to effectively manage storage on the network.

Add disk storage devices

The simple option to increase capacity is to buy more primary storage in various sizes, transfer rates and access times, including disks, automated data libraries and tape or optical drives. All are well-known, well-accepted and priced relatively inexpensively. This, of course, is a band-aid approach because it adds more mass storage capacity without necessarily improving overall network storage management.

A way to improve performance is to buy and integrate a redundant arrays of inexpensive disks (RAID) subsystem for the server (see story page 82). Of course, slow response time may also be because of the CPU speed of the server, network transmission speed, access time of the primary disk, software overhead, etc., which RAID cannot cure.

Automated data libraries (tape or optical) allow you to automatically fetch and restore data without manual intervention. Optical versions are available from a variety of sources, such as MTI, Inc., Aquidneck Systems International, Inc., Hewlett-Packard Co. and Sony Corp.

Storage Technology Corp. Odetics, Cambridge On-Line Storage, Exabyte Corp., Archive Technology, Inc. and Cipher Data Products, Inc. offer tape versions.

Centralize data archiving

Archival storage software places files on tape or optical devices, to be stored and racked off-line, removed from direct control by the system. Palindrome Corp. is one of the leaders in this area.

The biggest purchase issue with archival storage software is how well it allows you to manage and track the data that's been stored off-line and how well the tape library logs data by individual pieces of medium and by files.

Consider how many pieces of medium you are trying to track — maybe you've got 100,000 pieces of data sitting off-line. Does the software know exactly where every file is, which room it's in, which medium it's on? To complicate things, what you really want is a database that will tell you where a file is and on which medium at different times of the year. So instead of 100,000 pieces of data, you've got 20 million! In general, such large tape libraries have not been developed for large network systems — at least not yet.

Centralize data backup

Data backup and restore software places files on tape and optical devices. This software is the most competitive area of network storage management software. All the leading

Need for speed

Erasable optical drives are more costly than tape drives. However, if you're very concerned with access time, erasable optical might be more your speed. Access time is measured in milliseconds on erasable optical, as opposed to 15 seconds or greater on tape.

What Novell is up to

Novell is certainly not standing still while third parties wrangle for control of the backup market. It has created something in its NetWare Version 4.0 called System Managed Storage, which is essentially an umbrella of protocols to use when backing up non-Novell workstations. In other words, it provides a standard protocol for the third-party backup packages to use rather than having each backup package manage non-Novell workstations on their own. Eventually, Novell may come out with its own hierarchical storage management software or backup and restore package. So far, however, it's just made the move to get third-party backup vendors out of the protocol business.

What's missing

Here are some areas in which products fail to meet the requirements of the "perfect" network storage system.

Universal platform attachment capability. Many software products are limited in the number of platforms they support.

Cross-operating system operation. Many software products can manage data only on a single network operating system.

Common data format for all medium types. If all products supported a single logical data format, data could be transferred among networks, assuming the attached physical peripherals were all the same.

Cost-effective drives with faster data access. Although peripherals are relatively cost-effective, there is room for faster access times at reduced prices, particularly for tape drives.

Cost-effective operational techniques for instantaneous data backup. You can have instantaneous backup through disk mirroring, but that's an expensive technique because primary disk drives are duplicated on a one-for-one basis. An effective software approach that provides this capability is not yet available.

Quick. Think of a company with better business UNIX price/ performance than IBM.

Network Storage

packages work reliably.

In Unix, leaders include Raxco Software, Inc., General Atomics DISCOS Division, Software Partners/32, Inc., Delta Microsystems, Inc. and Legato Systems, Inc. Legato actually claims it can attach to both NetWare and Unix networks. (For leaders in Novell, Inc. NetWare environments, see page 86.)

The major areas of vendor differentiation include the following:

- **Operating system attachment capability.** Although all vendors are driving toward multiple station support, many only attach to one operating system. Emerald Systems Corp. is a standout in its ability to attach to NetWare networks via a Microsoft Corp. Windows interface.

- **Device attachment capability.** Not all software vendors attach to as many of the tape and optical drives that you may wish to use for backup. But many vendors, such as Cheyenne Software, Inc. and Sytron Corp., have a breadth of attachment options that allow for all popular tape technologies and numerous vendors' drives to be utilized.

- **Point-of-network attachment.** You can purchase either a workstation-, server- or tape station-based backup package. Most vendors have migrated to a server-based configuration to allow for higher performance tape operation.

You can run into trouble with server-based packages, though, when you have multiple servers with large amounts of data. That's because you need fast operation to back up the network within one eight-hour shift, and you may be limited to only one backup operation at a time with server-based products.

To solve that problem, GigaTrend, Inc. and Intel Corp. offer tape station-based packages that scan the network concurrently.

- **Network stations supported.** Not many of the backup software products can simultaneously back up data to a wide variety of workstations. With the acceptance of Univel (the Novell Unix attachment strategy), the capability to integrate multiple pieces of storage on a single network increases.

- **Speed of database creation for backup histories.** Backup packages are traditionally pretty slow at creating backup histories, so the time required to create a file history database may take as long as or longer than the actual backup. GigaTrend has developed a high-speed approach to the database creation problem, which is included in their MasterSafe software package for Novell NetWare networks.

Automate data migration

Hierarchical storage management software automatically migrates data to a primary storage device from a secondary storage device and vice versa. In effect, it creates the image that the amount of data space on the network is infinite, thereby relieving individual users from the chore of managing primary disk space.

With hierarchical storage management, you never get a DISK FULL message. Files that are migrated leave a tag on the primary disk so that if you want the data file, the software will signal the secondary storage.

So far, hierarchical storage management software is available only on Unix networks, although it's just a question of time before it appears for Novell networks. Legato is working on a product, for instance. Other NetWare hierarchical storage management packages will likely come from the backup vendors or leaders in Unix hierarchical storage management software, such as Epoch Systems, Inc. in Westboro, Mass., Software Partners/32 in Topsfield, Mass., and QStar Technologies, Inc. in Rockville, Md.

One of the major issues with hierarchical storage management systems is how to migrate active databases to the secondary storage device or library. The higher the capacity (above 20G bytes), the more unmanageable the active database becomes.

Hierarchical storage management software also does not necessarily replace backup software. All the hierarchical storage management packages can back up data from an automated data library, but not all the data on the network is always under control of the hierarchical storage management package.

Efforts to better integrate hierarchical storage management and backup are under way, mainly through alliances and OEM agreements. GigaTrend, for instance, is marketing software on an OEM basis, as is Cheyenne. •

Term update

You have to be careful with the term "hierarchical storage management" (HSM). There are many interpretations of it. With HSM, data is staged to a primary disk device before used by the application and restored to secondary storage.

Under HSM, data is migrated from and back to the primary disk storage. Secondary storage devices that receive the "migrated" data can be as fast as solid-state disks or as slow as automated data libraries (ADL). On most operating systems, primary storage is usually fixed disk, with secondary storage being optical or tape ADLs.

Tto free primary disk storage, many HSM systems employ an "infinite storage capacity" feature, where data is automatically migrated based on a least recently used algorithm, from primary disk storage to a less expensive device that offers large capacity with slower access times.

Missing pieces

CONTINUED FROM PAGE 81

Keep in mind that storage management is not just backup. Two other aspects of data management are important: how quickly data moves through the network and how available it is.

The "perfect" network storage world would require minimal management and would provide the following:

- Virtually infinite storage capacity for each use.
- Transparent data access time.
- Almost instant recovery or graceful degradation when experiencing operational disasters.
- Automatic, instantaneous backup of all network data.
- Automatic tracking of all data regardless of whether it's on-line or off-line.

To a certain extent, available products can help you put these components in place, but no single system fully integrates them all. The network manager or IS group must chart its own path.

How easy is that to accomplish? Not easy at all. There are political issues, disorganization and chaos. Not to mention that corporate management doesn't want to get involved, given that data storage is hardly a revenue-producing function.

But high-level management *should* get involved: The only way to get beyond politics is through a well-defined storage strategy, backed by dollars and personnel. After all, if you aren't spending enough to back up data in an efficient, automated fashion during off-hours, you're bound to be taking the network down during crucial work time.

Because of the bounds of corporate strategic and operational objectives, the "perfect" network storage environment may not be attainable. However, the technology for "effective" management can, in large part, be implemented with the help of four basic categories of products: new types of storage media, archiving software, backup/restore software and hierarchical storage management software. Despite the fact that changes are under way, it's still a good idea to get something in place now. •

Elizer is president of Data Storage Concepts, a consulting firm in Boulder, Colo.

Quick. Think of a company with a better business UNIX environment than IBM.

User view

The quicker, the better

By Robert M. Knight

For Valerie Gill, business analyst at Chicago's Northern Trust, quick access to data is a big problem. The bank operates as many as 40 Novell, Inc. NetWare PC local-area networks. There's plenty of off-the-shelf software for on-line storage and plenty for archival storage but virtually nothing for what is called "near-line" storage — that is, a place to house files that don't necessarily need to be on-line but are accessed frequently enough that archiving would be inconvenient.

"Right now, we back up the file to a tape. If someone needs the file, you put the tape back on the drive, search through the tape for your file and then copy the file back on the LAN's main storage drive," Gill says.

The search time required "is usually a very expensive amount of time," she continues. "If you can't find a file and restore it within two minutes, it gets cumbersome."

Two years ago, the bank was dealing with only 60M-byte tapes. Now "we have LANs with a gigabyte of storage [each]," Gill says. "The technical backup solutions and the speed have become very big issues."

What Gill says she would like to do is centralize backup facilities. Several departments might use the same backup unit, "as opposed to 40 LANs doing their own thing," Gill says. "But if you combine three LANs with 1 gig each into one backup solution, we're now talking about backing up 3 gigs, and you need a very reliable, large-capacity backup solution to handle that.

"You're also beginning to need a better solution to search for a file on those tapes, if you need to restore a file," Gill says. "And then there's a political issue: people saying, 'I don't want my LAN to be on the same backup system as that department.'"

There are a couple of areas where Gill sees room for improvement with backup software. One of these is reliability. She says a high percentage of backups don't have great data integrity. "You couldn't restore the files if you had to," she says, "and, of course, the vendors say you must have done something wrong. We're looking for vendor products to be more compatible with other industry products."

Additionally, Gill says, she'd like backup reports to include details such as where the problem happened so you can troubleshoot it.

And third, she would like to be able to back up all kinds of files with the same utility instead of putting all MS-DOS files in one place and Apple Computer, Inc. Macintosh files in another.

As for whether Northern Trust will eventually centralize storage, "we'll just have to wait and see," Gill says. "It could be under IS control, or it could be departmentally controlled or divisionally controlled." •

Knight is a free-lance writer in Chicago.

Biggest gripes

For users of distributed LANs, the biggest storage issue is "near-line" storage — that is, a place to house files that are accessed frequently enough that archiving would be inconvenient. A closely related problem is quick access to stored data. Backing up multiple LANs can be a problem if they are heterogeneous. Administrators need a common utility for all LANs.

> **The search time required "is usually a very expensive amount of time."**
>
> *Valerie Gill*
> *Northern Trust*

Software sampling

The following are among the leading vendors in the backup and data management markets for PC LANs

	Network backup	Network data management	Server-based network data management
Cheyenne Software, Inc. (516) 484-5110	Solo	ARCServe	
Colorado Memory Systems, Inc. (303) 635-6477	Jumbo		
Digital Equipment Corp. (508) 493-5111	Pathworks Desktop BU		
Emerald Systems Corp. (619) 673-2161	EM/Save/ EMQ	Xpress Librarian 2.0	
Emeritus Technologies (209) 292-8888	Tapeware		
Enterprise Data, Inc. (201) 316-0500			UpStream
GigaTrend, Inc. (619) 931-9122	ServerDAT		MasterStation
IBM Contact local representative			DFDSM
Intel Corp. (503) 696-8080			Storage Express
Legato Systems, Inc. (415) 329-7880		Networker NLM	
Maynard Electronics (407) 263-3500		MaynStream	LANStream
Mountain Network Solutions, Inc. (408) 379-4300	FileSafe/Talk FileSafe/ Wizard		
Network Systems Corp. (612) 424-4888			User-Access
Palindrome Corp. (708) 505-3300		Network Archivist	
Sytron Corp. (508) 898-0100	Sytos+		
Tallgrass Technologies Corp. (913) 492-6002	FileSecure Enterprize		
Tecmar (216) 349-0060	QTOS	ProServe	

Source: Peripheral Strategies, Inc.

Tape stations: The new performance alternative

By Lee Elizer

There is a relatively new school of thought that says you can achieve greater performance by putting tape activity on a dedicated network station rather than using it as a shared activity on a server. So far, two companies — GigaTrend, Inc. and Intel Corp. — have broken out of the crowd and developed tape station-based backup and restore network products for Novell, Inc. NetWare environments.

What puts this strategy ahead for Novell networks? The tape station approach provides several attributes not found or needed in server-based backup software:

- **Network protocols that move data more rapidly across the backbone of the network.** The objective is to improve average data rates for the backup operation. Faster tape drives do not necessarily speed up the backup process if data cannot be fed more rapidly from throughout the network.

GigaTrend is achieving 50M-byte/min. sustained transfer rates on an Ethernet network backbone and 80M byte/min. on a fiber-optic network backbone.

- **Improved database history creation** because of significant data traffic to the tape station. This is key for improved performance, as some database history creation algorithms may take an additional three hours to create when the backup took only three hours itself. GigaTrend currently claims to build a global file history in four to five minutes.
- **Backup in parallel** allows two, three or more backup operations to be performed simultaneously, thereby increasing total data throughput. This parallel operation should be flexible in allowing multiple backups to be mixed on a single tape drive or to be split, concurrently, to multiple tape drives.

Backup in parallel also increases the aggregate data rate to a level where streaming tape drives can maintain constant streaming, a definite performance advantage. •

Software characteristics

Network data management-class software is the most advanced available in the PC LAN market today

	Network backup	Network data management	Network storage management
Backup/Restore multiple servers	●	●	●
Backup/Restore multiple clients	●	●	●
Tape catalog	●	●	●
Disk base database/librarian		●	●
File migration		●	●
Library/Loader/Jukebox support		●	●
Media management		●	●
Support for multiple operating systems		●	●
Application server-based		●	●
Continuous on-line operation		●	●
Distributed processing, concurrent operation		●	●
Appears as a network storage resource			●
Librarian appears as a network resource			●
Hierarchical storage			●
Disk grooming			●
Remote vaulting			●
Reports to network management			●
Disaster protection features			●

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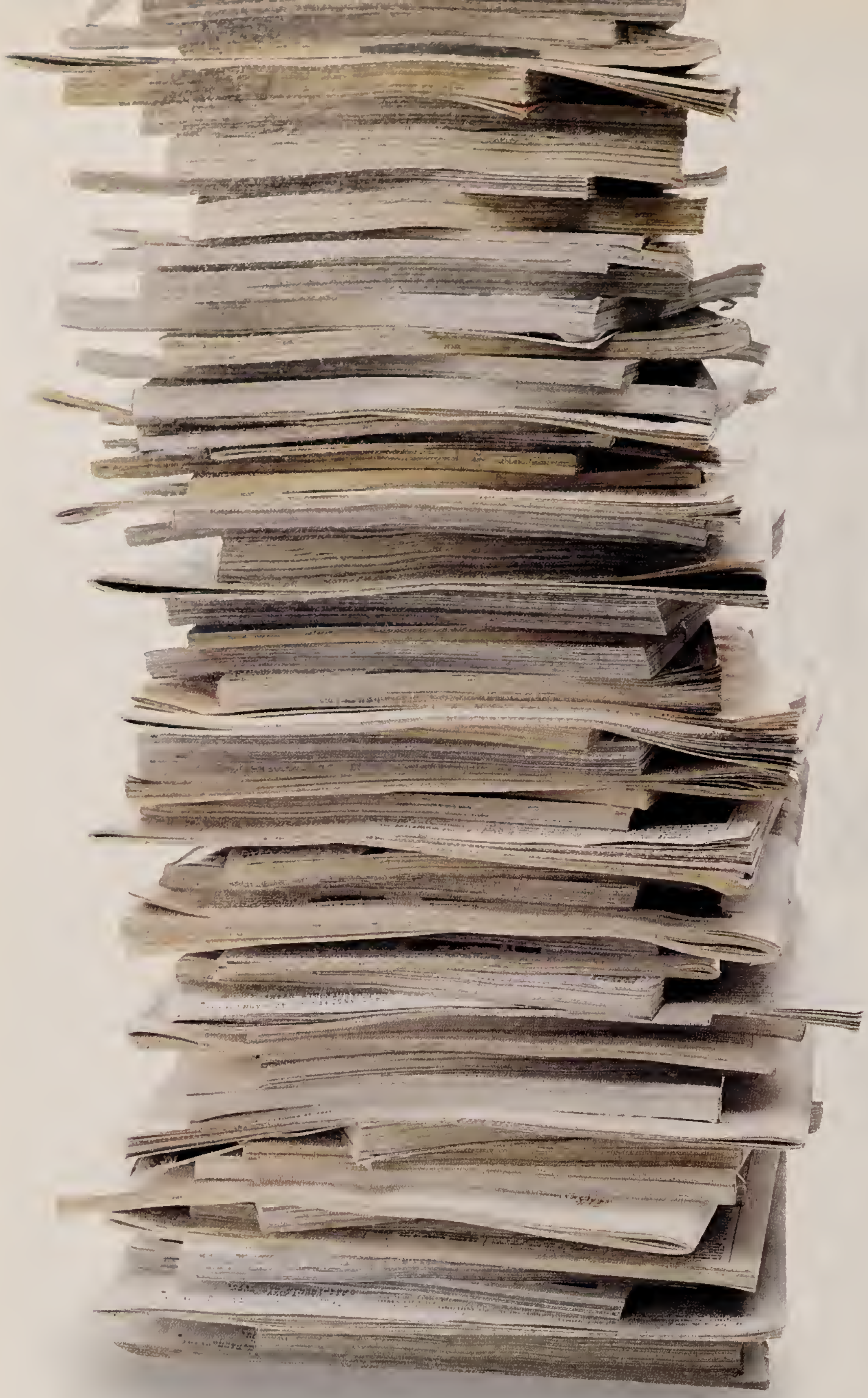

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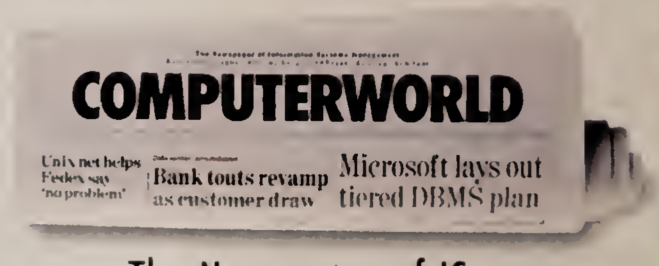
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Network Storage

NCR 6298 RAID subsystem: Fast and reliable, but users say costs are higher than they expected

Computerworld's Firing Line is an evaluation based on interviews with major users at corporate and educational installations. The product under evaluation is being used in live application environments.

NCR 6298 RAID subsystem

- Early adopters of the NCR 6298 Disk Array subsystem say the system is a strong and highly reliable storage alternative, but they are concerned about the cost compared with other RAID configurations on the market.
- Evaluators report extremes in ease of installation from difficult to very easy. Differences may depend on complexity of your configuration and ability to use system defaults.

NCR Corp.'s 6298 disk array subsystem is the flagship product in the company's random arrays of inexpensive disks (RAID) storage line, which ranges from high-capacity subsystems to RAID-enabled servers and software.

Introduced in September, the 6298 currently supports NCR's multiprocessor servers, such as the 3550 running Unix V Release 4. In the first quarter of 1993, the company said, it plans to provide support for IBM's RISC System/6000, Personal System/2 and other PC servers.

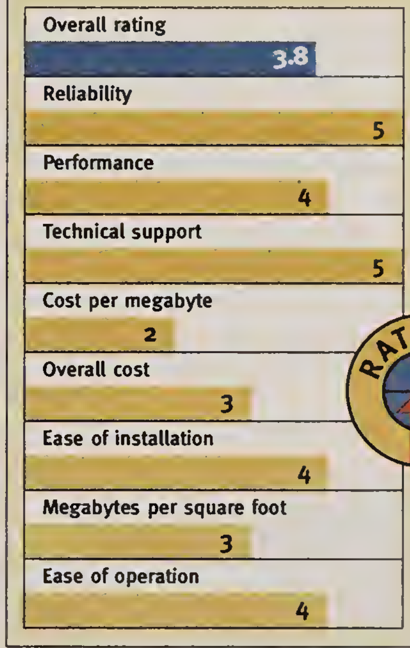
Unique features of the product include the ability to adjust the drives in the system to various RAID levels to match work load and redundant controllers, which allow greater reliability. Optimizing the subsystems with flexible RAID levels does entail a learning curve for users. NCR said that next year, it plans to introduce automated tools to help users better tune their systems.

Installation descriptions for users who evaluated NCR's 6298 RAID subsystem

	Distributor	Utility	Petroleum company	Manufacturer
Server used with subsystem	NCR 3550	NCR 3550	NCR 3550 NCR 3445	NCR 3450
Amount of storage	6G bytes	3.2G bytes	8G bytes	5.2G bytes
Application work load	RDBMS Financial and Distribution	Testing Oracle RDBMS	Business systems	Oracle RDBMS
Number of users	50	No comment	74	Varies
Overall cost	$75,330	No comment	No comment	No comment
Cost per megabyte	$9.33	$14	No comment	$6.63
Previous system	NCR 8565 with 1G byte storage	No comment	NCR 9800	None
Comparison system	IBM RS/6000 with Cambex Certainty/6000	Pyramid with 1G byte SCSI disk	NCR 9800	Internal NCR 3450 RAID

NCR's 6298 RAID subsystem

Ratings are based on user expectations on a 1-to-5 scale, where 1 is below expectations and 5 is above expectations. Ratings are presented in order of importance to users.



Varying RAID levels

RAID levels range from 0 to 5, with the following components at each level:

- **Level 0:** Offers high data-transfer rates because data is striped across several disks.
- **Level 1:** Duplicate data is stored on separate disk drives. This disk mirroring ensures that critical files will be available in the event of an individual drive failure. This is the most expensive form of RAID.
- **Level 2:** Hamming code is stored on additional disk drives and is used for error detection and correction.
- **Level 3:** Data is striped in parallel across several disks, and error correction data is stored on dedicated parity disks. This is considered best for high data-transfer rates for writing and reading large files.
- **Level 4:** Data is stored and retrieved using independent writes and reads to several data drives. Error correction is on the dedicated parity disk drive. Write performance is less on this level because each write operation to a data drive must also write to a parity drive. This makes RAID-4 better for read-intensive applications.
- **Level 5:** User data and parity data is interleaved and striped across several disks. There is no dedicated parity drive. Data is written simultaneously to two or three separate drives to reduce the performance penalty. This level is best for high I/O operations that involve writing and reading large numbers of small data blocks at random disk locations.

This evaluation of the NCR 6298 is based on a teleconference with four users operating the product in corporate environments. Two of the four were using the systems in extensive production mode, while the other two had evaluated the system and were still in the preimplementation phase.

The questionnaire and methodology for Firing Line were developed with the help of Howard Rubin Associates, Inc. and Technology Investment Strategies Corp.

Reliability

The 6298 has the advantage of allowing replacement of drives or boards when problems occur without requiring a system shutdown. Redundant drives and controllers can bear the work load when another system fails.

Users found this to be a great advantage over RAID storage installed directly in the server. They also reported very few equipment failures.

Utility: "The system has never failed."

Petroleum evaluator: "We found a bad board when we changed RAID levels. NCR replaced it, and it works fine. There was no downtime because of the redundant features."

NCR 6298, *page 90*

Users of NCR 6298 say they want lower cost, proactive service and easier customization

CONTINUED FROM PAGE 89

Performance

The speed of the 6298 ranged from "as expected" to "more than anticipated" for the four evaluators. Only two of the users optimize the system, varying RAID levels to match work load.

According to NCR, RAID-1 is best for applications with a high percentage of writes. RAID-3 works best for large block sizes, and RAID-5 works most efficiently with small block sizes.

Petroleum evaluator: "We are using RAID-3 and RAID-5 with the Informix Corp. relational database management system. It runs 40% to 50% faster than it runs on our previous system [an NCR 9800]. I wasn't quite ready to optimize for the different RAID levels, but NCR provided brochures and benchmark information, and that helped."

Distributor: "The performance was faster than I expected with a fourth-generation language. We are staying with the RAID-5 default at this point."

Utility: "We have done some work with the different RAID levels — just setting them up and ensuring that we can backup on all the differing levels and the homegrown application packages. We expect that most of [our] users will be on the Oracle database, and they will need RAID-5. It appears that 5 gives you the parity to prevent data loss, and 5 does the stripping by blocks instead of by character or by word, which Level 3 does. So we expect 5 to be the most efficient in that environment."

Technical support

The users were all satisfied with NCR's responsiveness to technical problems. But they said they also felt the company could be more aggressive in checking to find out what was needed.

Facts about NCR s 6298 RAID subsystem

- Provides up to 8.4G bytes RAID storage in separate cabinet.
- Uses both low- and high-end SCSI RAID chip sets.
- Adjustable RAID Levels 0-5.
- Includes hot spare, hot pluggability and redundant power supply.
- Includes redundant duplexed controllers as options.

Distributor: "I have an inventory of parts at my disposal right at my own site and that's unusual. It was NCR's idea."

Utility: "We have not had any failures, but I don't feel that the vendor is being very proactive in working with us."

Petroleum evaluator: "Support is fine. We've had fast response for when we had a problem. We also have the disks here. The operators can replace them themselves."

Cost per megabyte

The evaluators reported that the costs were higher than they expected, and they said NCR should lower its prices.

While NCR said the cost per megabyte should be about $5 for a fully configured system, the users' figures ranged from $6.63 to $14 per megabyte.

Manufacturer: "On the whole, NCR prices are high, and the 6298 was about 25% higher than what we expected. I think their maintenance costs are also high."

Utility: "The cost is about 25% higher than expected. I'm benchmarking it against our Pyramid machines, which use mirroring and complete duplicating of disks. I expected the RAID system to be a lot less than the Pyramid and it costs more."

Ease of installation

The evaluators were divided on this category. The ones that stuck with the default configurations of the installation and operation reported very easy implementations. But the users who tried to customize the subsystem for more complex configurations had trouble.

Utility: "The physical installation of the box went very smoothly, very efficiently. But the configuration was much more difficult than conventional storage systems. Administration and operation of the machine are a little confusing.

"Even though there is a menu-driven tool for the logical partitioning, it was confusing because they are using a new disk device name scheme instead of the standard Unix scheme. Also, as part of the partitioning, the tool has to set up some type of internal tables, and I'm not exactly sure what it does, but that took quite a long time.

"It currently takes about half an hour to go through. So in the middle of the partitioning process, you have to stop and walk away from your terminal for half an hour and then come back later and finish it."

On the opposite side was the petroleum evaluator: "I finished everything — all the partitioning and everything — in about 30 minutes, maybe 40, but I didn't see it as slow."

The distributor evaluator also found installation and operation easy. "It was a piece of cake," the user said. But the user plans to implement an image processing system that will require tuning the subsystem further.

The manufacturer was in the middle: "If you just accept the defaults, it's pretty simple. But if you want to set up — if you want to do anything that is not default — you have problems. We had similar problems adding a drive internally to the 3450, so I don't think it's a 6298 problem."

Megabytes per square foot

The evaluators' response to this category depended on what the 6298 was replacing.

Petroleum evaluator: "It was what I expected. We had a small mainframe, and it was taking all up all the computer room. Now we have a 3550 and the two 6298 RAID subsystems. It's like there is almost nothing in the room compared to the mainframe. And we have more megabytes."

Distributor: "It takes up about 1/20th of the space of the NCR 8565."

Written and compiled by Michael Sullivan-Trainor, CW research manager

NCR responds

Here are NCR's responses to some of the issues raised in this evaluation.

Q: Why is the price on the 6298 higher than the prices of competing products?

A: The 6298 is very competitively priced when compared with subsystems with equivalent features and functions. In October 1992, NCR released a 1G-byte drive version of the 6298 that increased the product's cost-effectiveness. The fully configured 6298 costs about $5 per megabyte.

Q: Why is it difficult to customize the 6298?

A: The additional time and effort required to take advantage of the extensive customization opportunities on the 6298 are primarily a result of drive formatting. The average installation time on customized systems can range from 30 minutes to three hours, depending on drive capacity, number of drives and type of configuration changes being made. Some changes, such as opting for RAID-3 over the RAID-5 default, require drive formatting. Because many of our users have RAID-5 applications, they opt to use the default settings and do not experience the delays in formatting drives. Also, NCR offers an installation service for $1,225.

Q: While there were no complaints about technical support responsiveness, some users said NCR is not proactive. What is your response to this?

A: At the Peripheral Products Division, we have created a customer survey program. Senior staff managers and the general manager participate directly in the program. In 1992, our surveys yielded a 95% satisfaction rate.

Q: How is NCR addressing the learning curve required for users to optimize RAID levels to match their processing demands?

A: At first, NCR concentrated on educating the industry. We are now shifting gears to accommodate "tuning" issues. In 1993, we will issue a white paper on performance testing.

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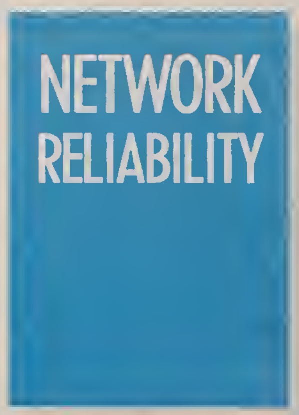
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Industry Currents

Automotive opportunities still in high gear

By Stefanie McCann

The automotive industry may have been adversely affected by the recession, but information systems jobs in the industry were left unscathed.

The Big Three automakers have been layoff-resistant in IS, according to Chuck Muller, a partner at Andersen, Jones & Muller Associates in Southfield, Mich. "Ford and Chrysler have cut back, but not in the IS area because they are key to the business," he says.

Should you go with a European import or a Japanese import or stick with a domestic producer? That question may cross your mind when buying a car, but it could also be relevant if you are considering an IS career in the automotive industry.

European importers place a great deal of emphasis on business experience, while Japanese importers look for heavy technical experience.

Domestic manufacturers, on the other hand, prefer to breed their own IS professionals; they do most of their hiring straight from graduate schools (or top undergraduate programs) and teach candidates from scratch.

"We are sensitive to people with previous automotive experience," says Kenneth Barile, manager of MIS at BMW of North America, Inc. in Westwood, N.J.

Volkswagen of America, Inc. in Lanham, Md., looks at "the actual user process and maps that into a business process over a computer process," explains Stephen Pickett, director of IS at Volkswagen.

Japanese auto distributors, such as Toyota, are more interested in technical training, says Robert Best, group vice president of finance and administration at Toyota Motor Sales USA, Inc. in Torrance, Calif. IS responsibilities range from office functions for purchasing and finance to maintaining, training and supporting the Toyota Dealer Network, the company's proprietary network.

IS expansion likely

Best reveals that Toyota's IS department may continue to expand thanks to a major project involving North American parts. "Japan will be transferring parts and ordering functions to the U.S., so we'll be ordering parts direct from American suppliers. This will be a very large effort," he says.

Japanese distributor Isuzu Motors of America in Whittier, Calif., looks for Cobol, CICS, IMS or DB2 experience, says Gary Cray, vice president of MIS at Isuzu.

Recently, Isuzu has been pushing for skills in computer-aided software engineering (CASE) and CASE methodologies. The need for PC skills is also on the rise there. The firm is heavily involved in electronic data interchange (EDI).

Best opportunities: Detroit. Also pockets of opportunity in Southern California and the Northeast.

Salaries: $35,000 to $55,000 for programmers with three to five years experience.

Hottest job titles: With the distribution of the LAN and the increasing complexity of managing data, the role of a database administrator has become critical. Also, analysts with strong CASE or expert system skills.

Technical skills : EDI, Cobol, CICS, IMS, DB2, PC skills, CASE tools.

"All of our suppliers have to be on EDI, and we also use it for our service/parts business and domestic suppliers. It's used in the parts-ordering functions," Cray says. "We weigh automotive and distribution skills heavily. We are largely a distributor and are looking for people who can understand the concepts of this business."

Nissan Motor Corp. favors professionals with a strong technical background. Additionally, Nissan looks for people who have been involved in leadership roles in different IS or user groups in a production or manufacturing environment, according to Tony Lucente, manager of IS department dealer services at Nissan.

"We also have some jobs here that are very dealer-oriented, so we've been hiring people from dealer shops in more of an analytical capacity to help with business planning," Lucente says. "And since we're a distributor, we need IS people that have had specific experience with retail and point-of-sale systems."

Nissan also wants people with CASE backgrounds, as well as a strict discipline in systems development methodology and DB2.

And there is plenty of opportunity at the Big Three automakers, as long as you're prepared to start right out of school and work your way up. If you want a job at Ford Motor Corp. in Dearborn, Mich., for instance, you need a degree from a school that Ford calls "best in class" universities, such as Stanford University and MIT, explains Chuck Feltner, director of manufacturing planning and IS in the parts components group.

There is an exception: Candidates with EDI skills. Because this technology isn't taught in universities, companies expect candidates to have actual work experience in EDI.

Chrysler Corp. in Highland Park, Mich., exclusively wants people with advanced degrees, such as MBAs, to work in its IS departments. Such candidates are recruited into Chrysler's Advanced Development Degree Program, a 1½-year initiation consisting of three, six-month assignments, says Kenneth Quint, manager of manufacturing and assembly process at Chrysler.

One thing that domestic, European and Japanese car makers all agree on is the amount and variety of opportunity the automotive industry has to offer.

"This is an industry that is very much computerized, from manufacturing to dealing to distribution," Best says.

McCann is assistant researcher.

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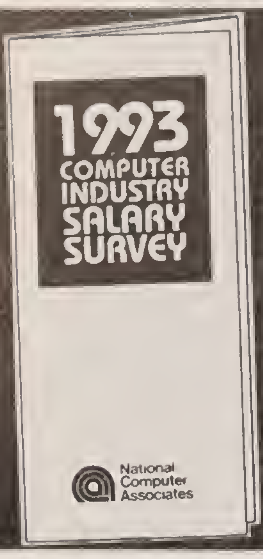

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Career advice for the '90s

Proper self-marketing key to job move

Fast Track is a twice-monthly column dedicated to answering questions on career directions. This week's guest adviser is Max Messmer, chairman and chief executive officer of Menlo Park, Calif.-based Robert Half International, Inc., an information systems placement firm.

Q: With a bachelor's in computer science and a master's in library science from a U.S. university, I am working as a corporate librarian but would like to work as a programmer or systems analyst. I have many years of applications experience in China and am familiar with Cobol, Pascal, Fortran, Lotus' 1-2-3, dBase, the IBM PC, Hewlett-Packard 3000 and VAX. How can someone with my background move back into the computer field?

A: Your background includes extensive academic credentials and very marketable skills in many types of hardware, software applications and languages.

The best plan of action is to prepare a resume highlighting your IS skills and to research the types of companies and industries that interest you. Of course, if you have specific expertise, that is where your background will be most marketable.

Because you appear to have some of the skills that are in demand today, the key to finding a job may lie in marketing yourself effectively. To help you with this task, there are many resources available, ranging from books and periodicals to courses at a nearby community college.

Q: I am a project manager responsible for managing payroll and financial systems in a large IBM mainframe environment. Every year my responsibilities increase, and my staff decreases. How can I protect my future at my current employer?

A: Companies value employees who contribute, are loyal and exhibit a solid work ethic. If your unit is outsourced, however, and your firm is adequately staffed , your fears may be realized. To improve your longevity, analyze your organization and evaluate key departments. See if you can begin a transfer process to move into one of them.

Additionally, keep in step with your organization's technology direction and learn new skills that your company is planning to implement. Also, share your concern with your manager to see how secure your position is.

Q: I am a mainframe Cobol programmer with 10 years of experience. My employer is reluctant to train me or provide me with a PC. What other ways can I learn?

A: Learning additional technical skills, such as working on a microcomputer, is important to your professional growth and job marketability. Don't be discouraged by your employer's reluctance.

There are many other ways to achieve your goal. For example, training is widely available and often at a limited cost through adult education classes or computer clubs.

If you decide to buy a PC and need software, I suggest starting with basic spreadsheet, word processing and relational database software. In addition, some computers come with bundled software. An excellent way to try out programs is through computer clubs that offer shared and public domain software.

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How programmers can acquire analysis experience

■ When a new system request comes in, volunteer to do the front-end analysis. We allow programmers to get involved from the beginning because we believe we'll get better code if they understand the system. Bringing that benefit to the department's attention can help. Or, just do it on your own and see how it varies from what the systems analyst finds.

Karen French, manager of programming
Ingersoll-Rand Corp., Westwood, N.J.

■ A standard logic class might be the way to start, then look at some case studies. There's no substitute for practical experience. We're starting to go over our programs in some reasonable depth, and we're having sessions for all the programmers, which gets them involved in this analysis.

John Norman, director of MIS
Long Beach Bank, Orange, Calif.

■ If you're going to be in a business or scientific environment, work with a broad base of platforms. You will get more opportunities to look at the unique problems associated with each platform or technology that you're using, and that will prove your problem-solving/analytical skills.

Ron Krause, manager, MIS programming
Nevada Power Co., Las Vegas

■ We try to have programmers work with someone with experience in that area, typically on a small project. Then they gradually take on more responsibility.

Randy Winkelman, systems development manager
Black Hills Corp., Rapid City, S.D.

Compiled by Derek Slater, product research coordinator.

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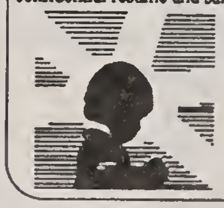

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Computerworld/CorpTech Career Index

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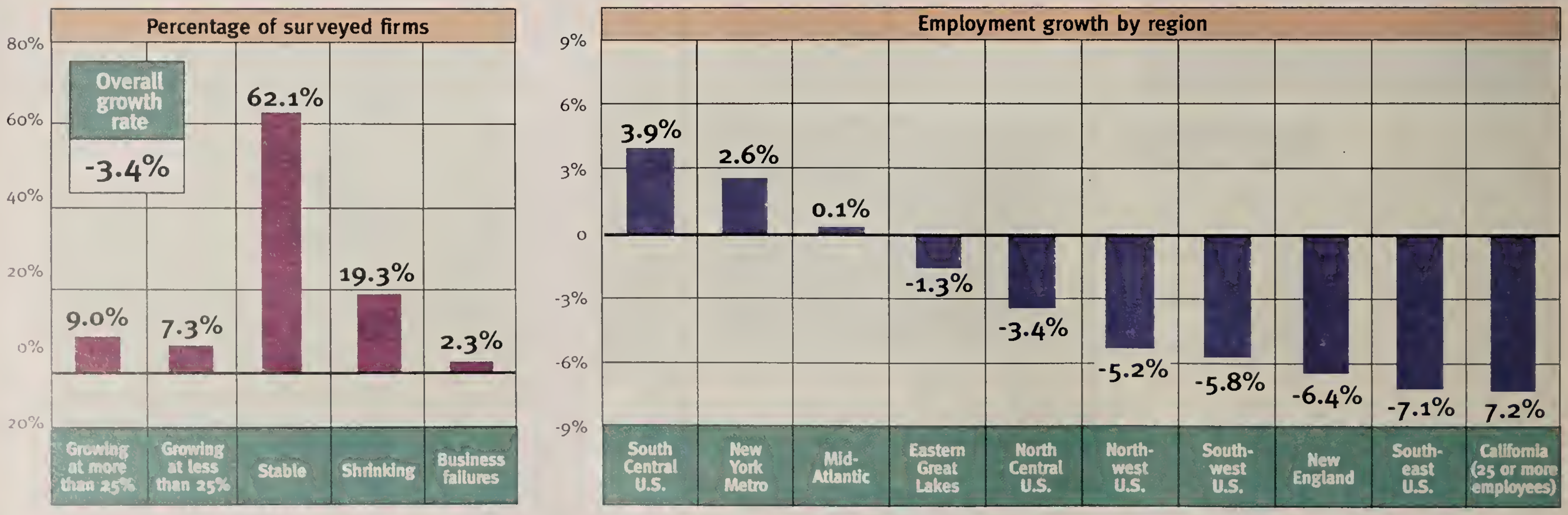

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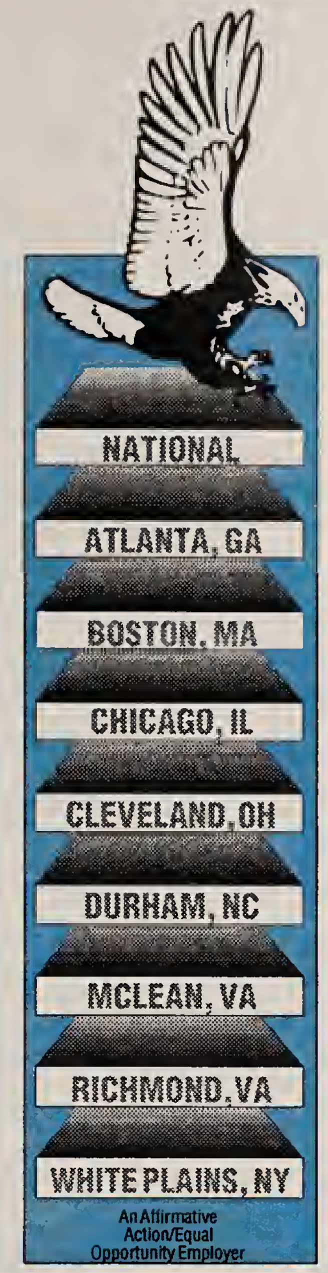

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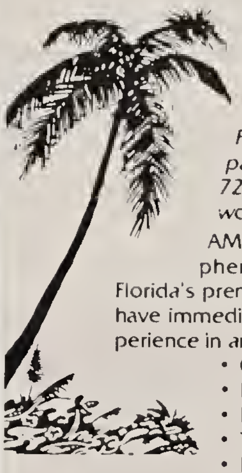

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Making mail-order choices

By Alan Radding

How do you choose a mail-order vendor? While we can't decide this for you, we can prepare you for the experience by giving you a dose of reality.

Early in December, *Computerworld* asked three mail-order vendors to respond to a request for proposal (RFP) that specified a purchase of 10 486SX-based PCs for a workgroup that was upgrading to Microsoft Corp.'s Windows.

The RFP specified the following:

- A desktop, full-cabinet, 25-MHz 486SX with 4M bytes of memory.
- Approximately 200M bytes of storage.
- Both 5¹/₄- and 3¹/₂-in. floppy drives.
- A 250M-byte, ¹/₄-in. tape drive.
- A 2.4K bit/sec. modem.
- A noninterlaced color monitor.
- DOS and Windows software.
- A minimum one-year warranty with on-site service.
- Payment terms: net 30 days, on approval of credit.

The following vendors were chosen:

- **Dell Computer Corp.**, a leader in the computer mail-order industry.
- **Northgate Computer Systems, Inc.**, a widely advertised brand.
- **PC-USA**, a small, little-known vendor.

Initially, Gateway 2000 was also chosen, but it could not be reached. It is reported to be installing more phone lines.

Here is what we found:

Dell, in Austin, Texas, offered a system with 170M bytes of storage for $2,832 per unit, including shipping and handling. A discount is available for orders over $25,000, but a Dell sales representative failed to get back with the discounted price.

Several days later, another Dell representative called with the price for a newly introduced, equivalent model that was several hundred dollars less. The new model was upgradable to Intel Corp.'s Pentium chip, offered better diagnostics and came with the local bus built into the motherboard. A slim-line model would be $250 less but would come with only three expansion slots rather than six.

Northgate Computer Systems in Minneapolis responded with a $2,556 price, which included shipping. The machine came with seven expansion slots, a 200M-byte hard drive and a combination fax/data modem running at 9.6K bit/sec. for fax and 2.4K bit/sec. for data. Also offered was a one-year limited warranty on parts and labor.

PC-USA in Walnut, Calif., came in with the best price for a 12-quantity order: $1,830 per machine configured with a 170M-byte hard disk. The company also offered a two-year warranty with one year of on-site service.

Radding is a free-lance writer based in Newton, Mass.

System quotations

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Hard drive	170M-byte	200M-byte	170M-byte
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2.4K bit/sec. modem	✓	Combination 9.6K bit/sec. fax/2.4K bit/sec. data modem	✓
Noninterlaced color monitor	✓	✓	✓
DOS 5.0, Microsoft Windows 3.1	✓	✓	✓
Warranty, on-site service	One-year limited warranty, one-year on-site service	One-year limited warranty on parts and labor, unlimited phone technical assistance, one-year on-site service	Two years parts and labor, one-year on-site service
Other	Keyboard, carrying case, modem software	Keyboard, carrying case, 250M-byte tape backup unit, Zero Insertion Force processor, integrated I/O, IDE hard and floppy drive interface	Keyboard, carrying case, 250M-byte backup drive, surge protector, AMI BIOS

CW Chart: Stephanie Faucher

ANALYSIS

Dell	Northgate	PC-USA
PROS The newly introduced machines are attractive because of the following: • Easy upgrade to P5 processor. • Local bus. • Reduced price. **CONS** • Vendor slow to follow up on discount.	**PROS** • Largest hard drive. • Competitive price. • Most expansion slots. • Fax modem. **CONS** • Vendor's reported financial problems.	**PROS** • Best price. • Best warranty. **CONS** • Although individual components are brand name, the vendor is not well-known.

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Advertisers' Index

Andersen Consulting **50**
BMC Software **65**
Chipcom **92**
Compaq Computer Corporation **46**
Computer Associates **5**
CT Meeting **60**
CW Circulation **88**
CW Classified **24,54,58,60**
Digital Consulting Corp. **58**
Digital Equipment Corp. **35-38**
EMASS Group **62**
EMC Corp. **30-31**
Fifth Generation Systems **61**
Hewlett Packard **34,83,84,85,87**
IBM **18-19,29,56-57,66-67,72-73,111**
Information Builders **68**
Informix Software, Inc. **112**
IPL Systems **22-23**
Knowledgeware **21**
Laser Data **20**
Lexmark **41,43,35**
Lotus Development Corp. **26-27,52-53**
Micro Focus **11**
Micropolis **78-79**
Motorola/Embarc **59**
Oracle Corp. **7,9**
Powersoft **74**
Racal Datacom **25**
SAS Institute **17,49,76**
Software 2000 **10**
Standard Microsystems **55**
Sterling Software **15**
Sybase **13**
Syncsort **3**
Trinzic Corp. **54**
Ungermann-Bass **70-71**
Windows World **80**
Xircom **24**

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Companies in this issue

Page number refers to page on which story begins

3Com Corp. 6

A

Aberdeen Group 4
Aetna Life and Casualty Co. 1
After Hours Software 40
Air Force Materiel Command 75,77
American Cancer Society 39
American Medical Association 6
Andersen, Jones and Muller 93
Apple Computer, Inc. 4,6,14,16,40, 47,51,84,86
Applix, Inc. 47
Aquidneck Systems International, Inc. 84
Archive Technology, Inc. 84
Arenburg Consultants 1
ASEA, Brown, Boveri 15
AST Research, Inc. 10,82
Atex, Inc. 6
Atmospheric and Environment Research, Inc. 20
AT&T 1,6,16,42
Attachmate Corp. 12,14
August Corp. 49
Automated Healthcare, Inc. 69

B

Babson College 1
Bank of New York 63
Bank South Corp. 109
Bankers Trust Co. 42,64
Banyan Systems, Inc. 14,15,47
Basis Information Technologies 109
Best Power Technology 110
BIT Software Corp. 44
Black & Decker Corp. 20
BMW 93
Borland International, Inc. 4,42,47,73
Broadband Communications Products, Inc. 60
Bruno Blenheim, Inc. 60
Bull HN Information Systems, Inc. 66

C

Cabletron Systems, Inc. 51
Caere Corp. 44
Cambridge On-Line Storage 84
Ceton Medical Center 69
Chevron Canada Ltd. 63
Cheyenne Software, Inc. 84
Chrysler Corp. 93
Cipher Data Products, Inc. 84
Cisco Systems, Inc. 42,110
Citibank NA 47
CKI, Inc. 6
Claris Corp. 51
Codex Corp. 48
Comdisco Disaster Recovery Services 64
Compaq Computer Corp. 6,39,63,82
Computer Associates International, Inc. 16,42,69
Computer Information Systems, Inc. 73
Computer Power, Inc. 73
Computer Sciences Corp. 16,20,110
Convex Computer Corp. 64
Coral Network Corp. 51
Coral Systems, Inc. 16
Core International, Inc. 82
Cray Research, Inc. 60,64,109
Crystal Computer Services, Inc. 73
CSE Resources, Inc. 66

D

Dartmouth College 20
Data General Corp. 48
DataEase, Inc. 39
DataPro Research Group 15
Dataquest, Inc. 109
Dell Computer Corp. 63,82,102
Deloitte & Touche 6
Delta Microsystems, Inc. 84
Demax Software 49
Digital Equipment Corp. 4,6,14,16, 51,63,64,109
Disk Technologies Corp. 44
Dr Pepper Co./The Seven-Up Co. 14

E

Eastman Kodak Co. 4,16,110
Edge Information Systems, Inc. 10
Eicon Technology Corp. 14
Emerald Systems Corp. 84
Empress Software, Inc. 73
Enron Gas Corp. 47
Ensearch Exploration 15
Epoch Systems, Inc. 84
Everex Systems, Inc. 10
Exabyte Corp. 84

F

Federal Aviation Administration 20
Federal Deposit Insurance Corp. 64
FileNet Corp. 42,109
First Financial Management Corp. 109
Fiserve, Inc. 109
Florida State University 12
Folio Corp. 16
Follow-Up Software Co. 44
Ford Motor Corp. 93
Fore Systems, Inc. 109
Forrester Research, Inc. 14
Fujitsu Network Switching of America, Inc. 60

G

General Atomics Discos Division 84
General Mills Restaurants, Inc. 69
Gigatrend, Inc. 84,86
GM Motor Sports Technology Group 10
Godwins, Inc. 10
Grand Junction Networks, Inc. 1,12
GTE Corp. 20

H

Hambrecht & Quist, Inc. 4
Harvard Medical School 16
Hewlett-Packard Co. 1,6,12,16,20, 42,49,51,60,64,82,84
Hoechst Celanese Corp. 42
Hogan Systems, Inc. 2
Hyatt Hotels Corp. 47

I

Ibex Technologies, Inc. 44
IBM 2,6,39,42,49,63,64,73,82,84,109,110
IBM Federal Systems Co. 40
ICR Survey Research Group 64
IDX Technologies, Inc. 39
IGI Consulting, Inc. 64
IMSL, Inc. 109
Information Builders, Inc. 42
Intel Corp. 16,48,69,84,86
Integrated Systems Solutions Corp. 2
Interactive Systems Corp. 16
Interconnections, Inc. 14
International Computer Recovery Center 39
International Data Corp. 1,4,10,14
Interop, Inc. 60
IQ Software Corp. 73
Isuzu Motors of America 93
ITT Hartford Life Cos. 47

J

Jordan's Furniture 48

K

Kansmen Corp. 73

L

Lanop Corp. 60
Legacy Storage Systems 82
Legato Systems, Inc. 84
Liberex Computer Systems, Inc. 6
Light Source, Inc. 4
LM Ericsson 16
Loral Aerospace Corp. 1
Lotus Development Corp. 6,12,16,39, 47,51,64,73,110

M

Manzanita Software Systems 44
Maximum Storage, Inc. 49
Maynard Electronics 84
McClellan Air Force Base 77
McCormack & Dodge 109
McDonnell Douglas Corp. 109
M.D. Anderson Cancer Research Center 110
Mead Data Central, Inc. 16
Mellon Bank Corp. 64
Merrill Lynch 109
MHS Alliance 6
MicroAccess, Inc. 12
Microbank Software, Inc. 42
Microdyne Corp. 14
Micropolis Corp. 82
Microsoft Corp. 4,6,12,14,15,42, 44,47,49,51,64,73,84
Mips Technologies, Inc. 51
MIT 93
Mobil Oil Corp. 51
Montana Power Co. 63
Motorola, Inc. 6
Mountain Network Solutions, Inc. 84
MTI Technology, Inc. 16,84

N

NASA-Langley Research Center 1
National Institute of Standards and Technology 6
National Computer Exchange, Inc. 39
National Technical Information Service 40
National Weather Service 20
NCR Corp. 6
NetFrame Systems, Inc. 6,63
NetWare Users International 1
Network General Corp. 16
Network Security Systems, Inc. 110
Network Systems Corp. 60
New Science Associates 69
Newport Financial Center 6
Nippon Denso 69
Nissan Motor Corp. 93
Northern Trust 86
Northgate Computer Systems, Inc. 102
Novell, Inc. 1,6,12,14,15,39,42, 47,48,49,51,60,63,84,86,110

O

Odetics 84
Oracle Corp. 48,63

P

Palindrome Corp. 84
Palo Alto Research Center 28
Parallan Computer, Inc. 63
PC Letter 47
PC-USA 102
Perma Power Electronics, Inc. 73
Phoenix Technologies, Inc. 60
Port Hueneme 1
PRC, Inc. 20
Precision Visuals, Inc. 109
Prime Computer, Inc. 63
ProtoView Development Corp. 73

Q

QStar Technologies, Inc. 84
Qualex, Inc. 110

R

Radius, Inc. 4
Raxco Software, Inc. 63,84
Reference Software International 109
Reseller Software Spectrum, Inc. 12
Royal Bank of Canada 69

S

Salomon Brothers, Inc. 4
Savitar, Inc. 4
Sequent Computer Systems, Inc. 6
S. G. Warburg & Co. 14
SHL Systemhouse, Inc. 16
Silicon Graphics, Inc. 64
Software AG of North America, Inc. 58
Software Partners/32, Inc. 84
Sony Corp. 84
SoundView Financial Corp. 109
Sprint Corp. 6
SSDS, Inc. 75
St. Claire's Hospital 69
St. Luke's Episcopal Hospital 69
Stanford University 93
Sterling Software, Inc. 81
Storage Dimensions 49
Storage Technology Corp. 84
StrataCom, Inc. 6,110
Summit Strategies, Inc. 63
Sun Microsystems Computer Corp. 49
Sun Microsystems, Inc. 6,14,42,64,84
SuperWylbur Systems, Inc. 73
Sybase, Inc. 6
Symantec Corp. 40
Syntrex Technologies, Inc. 60
Systems Center, Inc. 14
Sytron 84

T

Tallgrass Technologies Corp. 84
Tecmar, Sytron Corp. 84
Tektronix, Inc. 4
Telxon Corp. 69
The Burton Group 1,42
The Chase Manhattan Bank NA 2
Toshiba America Information Systems, Inc. 10
Toyota Motor Sales USA, Inc. 93
TransAmerica Corp. 63
Tricord Systems, Inc. 63,82
Trinzic Corp. 69

U

Ultra Network Technologies, Inc. 60
Unison Information Systems Ltd. 49
Unisys Corp. 6,109
Univel, Inc. 47
University of Wisconsin Hospital 69
University of Central Florida 42
University of North Dakota 1
Unix System Laboratories, Inc. 42
U.S. Department of Commerce 40
U.S. Department of Defense 20
U.S. LAN Systems Corp. 109
US West 60
US West Advanced Technologies 16
USM Corp. 73

V

VisiSoft, Inc. 51
Visual Numerics, Inc. 109
Vitalink 51
Volkswagen of America, Inc. 93
VXM Technologies, Inc. 64

W

Wang Laboratories, Inc. 6,109
Welbro Constructors, Inc. 42
Wisconsin Power and Light Co. 63
WordPerfect Corp. 39,51,109
Workgroup Technologies, Inc. 47

X

Xyvision, Inc. 6

Z

Zenith Data Systems 10

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Gainers / Losers

Percent

Gainers		Losers	
Pyramid Technology	41.0	Filenet Corp.	-36.3
Aptel Communication Corp	31.9	Everex Systems Inc. (L)	-33.3
Bolt, Beranek & Newman	26.3	Data Switch Corp.	-23.9
Intelligent Info. Systems (H)	22.2	Rexon Inc.	-18.5
Radius Inc.	20.0	Cambex Corp.	-14.1
State of the Art	20.0	Spinnaker Software	-13.1
Datapam Corp.	17.1	Weitek	-13.0
Texas Instruments	16.4	Trinzic Corp.	-12.8

Dollar

Gainers		Losers	
Intelligent Info. Systems (H)	11.25	Filenet Corp.	-8.25
Intel Corp. (H)	11.25	Policy Management Sys. (H)	-5.50
Texas Instruments	7.63	IBM (L)	-4.13
Motorola Inc. (H)	5.50	Parametric Technology	-4.00
CompUSA Inc.	4.63	Sybase Inc. (H)	-3.63
Xerox Corp.	4.25	Matsushita Electronics	-3.13
Pyramid Technology	4.00	Computer Sciences	-2.63
Peoplesoft	3.75	Synoptics Communications (H)	-2.50

Industry Almanac

Networking stocks up in 1992

Investors who sank their money into networking stocks made out like bandits in 1992. Nearly half of the year's top technology dollar gainers were involved in networking hardware or software. The bulk of the falling stocks came from the desktop software and big iron sectors.

—Derek Slater

TOP 20 GAINERS 1992	$	TOP 20 LOSERS 1992	
SynOptics Communications, Inc.	60.25	Borland International, Inc.	-60.00
Cisco Systems, Inc.*	45.50	IBM	-38.63
Motorola, Inc.	39.25	Adobe Systems, Inc.	-34.00
Intel Corp.	38.00	Symantec Corp.	-30.88
Newbridge Networks Corp.	33.63	Easel Corp.	-26.25
Intelligent Information Services, Inc.	32.63	Aldus Corp.	-24.00
Dell Computer Corp.*	30.92	Matsushita Electronics	-23.50
Cabletron Systems, Inc.	30.25	Picturetel Corp.	-22.13
Informix Corp.*	29.38	Digital Equipment Corp.	-21.50
Sybase, Inc.	28.50	Storage Technology Corp.	-19.13
Parametric Technology*	22.88	Quarterdeck Office Systems	-19.13
Compaq Computer Corp.	22.38	Structural Dynamics Research Corp.	-18.00
Wellfleet Communications, Inc.*	19.88	Bachman Information Systems, Inc.	-16.63
Standard Microsystems Corp.	19.38	Stratus Computer, Inc.	-15.88
Cheyenne Software, Inc.*	18.54	Cray Research, Inc.	-15.75
3Com Corp.	18.38	Zeos International Ltd.	-14.25
DSC Communications	18.13	Exabyte Corp.	-13.25
Policy Management Systems Corp.	17.25	Sequoia Systems, Inc.	-13.00
Progress Software Corp.	[illegible]	Compression Labs, Inc.	-12.38
Texas Instruments, Inc.	[illegible]	IPL Systems, Inc.	-9.50

Stock splits are taken into account. Companies marked with an asterisk (*) underwent splits in 1992.

COMMUNICATIONS AND NETWORK SERVICES — Off 0.7%

Exch	52-Week Range			Jan. 08 3 PM	Wk Net Change	Wk Pct Change
OTC	30.00	9.63	3 COM Corp. (H)	28.50	-1.13	-3.8
NYS	74.50	56.25	American Info Techs Corp.	71.13	-0.13	-0.2
NYS	53.13	36.63	AT&T (H)	50.75	-0.38	-0.7
OTC	4.25	0.75	Artel Communication Corp.	1.81	0.44	31.9
OTC	22.75	10.25	Banyan Systems Inc.	21.00	0.00	0.0
NYS	53.88	40.25	Bell Atlantic Corp.	49.75	-1.50	-2.9
NYS	55.50	43.38	Bellsouth Corp.	52.13	0.75	1.5
NYS	6.75	3.63	Bolt, Beranek & Newman	6.00	1.25	26.3
OTC	17.25	10.00	Brooktrout Technology	14.75	0.13	0.9
NYS	85.25	42.13	Cabletron Systems (H)	82.00	-2.00	-2.4
OTC	30.50	17.75	Chipcom Corp.	26.00	-1.25	-4.6
OTC	80.75	33.00	Cisco Systems Inc. (H)	79.50	0.88	1.1
OTC	34.88	5.50	Compression Labs Inc.	11.50	-1.00	-8.0
OTC	3.38	0.88	Data Switch Corp.	2.19	-0.69	-23.9
NYS	23.63	13.75	Digital Comm. Assoc.	18.88	0.63	3.4
OTC	15.25	7.50	Digital Systems Int'l Inc.	11.00	-0.25	-2.2
OTC	23.00	4.00	DSC Communications	22.88	0.88	4.0
OTC	10.88	4.75	Fibronix Int'l Inc.	7.50	0.75	11.1
OTC	37.50	10.50	Filenet Corp.	14.50	-8.25	-36.3
OTC	3.38	1.50	Gandalf Technologies Inc.	3.38	0.19	5.9
OTC	2.25	0.69	Gateway Communications	1.31	0.06	5.0
NYS	6.88	2.88	General Datacomm Inds. (H)	6.75	0.38	5.9
ASE	5.88	1.25	Go Video	3.13	0.00	0.0
NYS	35.75	28.88	GTE Corp.	34.38	-0.38	-1.1
NYS	72.13	55.50	ITT Corp. (H)	70.00	-2.00	-2.8
OTC	40.88	29.50	MCI Commmunications Corp.	40.50	0.88	2.2
OTC	14.25	2.25	Microcom Inc.	6.00	-0.13	-2.0
OTC	20.50	12.00	Netrix Corp.	18.75	-1.25	-6.3
OTC	16.75	9.63	Network Computing Devices	14.88	-0.13	-0.8
NYS	18.25	8.88	Network Equipment Tech.	9.63	-0.38	-3.8
OTC	25.50	8.00	Network General	18.00	-1.00	-5.3
OTC	20.00	8.50	Network Systems Corp.	12.75	-0.63	-4.7
OTC	43.25	10.38	Newbridge Networks Corp. (H)	40.63	-0.63	-1.5
NYS	49.25	30.50	Northern Telecom Ltd.	41.25	-1.75	-4.1
OTC	33.50	22.50	Novell Inc.	29.50	1.00	3.5
NYS	88.50	69.13	Nynex Corp.	84.13	0.25	0.3
OTC	37.50	14.50	Octel Communications Corp.	22.50	1.50	7.1
OTC	9.88	3.38	Penril Data Comm Networks	4.63	-0.63	-11.9
OTC	53.00	10.25	Picturetel Corp.	23.50	-1.75	-6.9
OTC	18.75	7.00	Proteon Inc.	9.75	0.63	6.8
NYS	27.50	10.16	Scientific Atlanta Inc.	24.25	-0.75	-3.0
NYS	74.75	56.63	Southwestern Bell Corp. (H)	72.75	-1.25	-1.7
NYS	26.75	20.75	Sprint Corp.	25.75	0.25	1.0
OTC	26.25	7.25	Standard Microsystems Corp	25.25	-0.75	-2.9
OTC	15.75	6.88	Stratacom Inc.	13.25	0.63	5.0
OTC	83.50	18.75	Synoptics Communications (H)	78.88	-2.50	-3.1
OTC	7.13	4.38	Telebit Corp.	5.63	0.13	2.3
OTC	24.25	13.38	US Robotics	20.25	-0.50	-2.4
NYS	40.00	32.88	U S West Inc.	37.88	-0.50	-1.3
OTC	39.25	12.00	Wellfleet Communications	36.25	-1.38	-3.7
OTC	22.00	7.00	Xircom	8.75	-0.50	-5.4

PC'S AND WORKSTATIONS — Off 1.5%

Exch	52-Week Range			Jan. 08 3 PM	Wk Net Change	Wk Pct Change
OTC	10.00	3.13	Advanced Logic Research	3.63	0.00	0.0
OTC	70.00	41.50	Apple Computer Inc.	62.25	2.50	4.2
OTC	24.50	11.25	AST Research Inc.	21.75	0.75	3.6
NYS	19.25	6.25	Commodore Int'l	6.25	-0.88	-12.3
NYS	49.88	22.25	Compaq Computer Corp. (H)	47.50	-1.25	-2.6
OTC	48.38	15.00	Dell Computer Corp. (H)	45.88	-2.13	-4.4
OTC	7.75	0.13	Everex Systems Inc. (L)	0.25	-0.13	-33.3
NYS	35.50	26.63	Harris Corp.	35.25	1.75	5.2
NYS	85.00	50.25	Hewlett Packard Co.	69.38	-0.50	-0.7
NYS	29.75	14.13	Silicon Graphics	28.00	-0.63	-2.2
OTC	36.50	22.50	Sun Microsystems Inc. (H)	35.88	2.25	6.7
NYS	31.75	22.25	Tandy Corp.	30.13	0.38	1.3
NYS	11.13	5.00	Zenith Electronics	6.13	0.25	4.3
OTC	25.50	2.75	Zeos International Ltd.	4.13	0.38	10.0

LARGE SYSTEMS — Up 3.2%

Exch	52-Week Range			Jan. 08 3 PM	Wk Net Change	Wk Pct Change
ASE	20.63	6.63	Amdahl Corp.	6.88	-0.38	-5.2
NYS	16.38	4.75	Convex Computer	8.00	0.00	0.0
OTC	9.50	1.88	Cray Computer	4.38	0.50	12.9
NYS	49.50	19.00	Cray Research Inc.	23.00	0.00	0.0
NYS	18.13	7.13	Data General Corp.	11.88	0.25	2.2
NYS	65.50	30.38	Digital Equipment Corp.	34.88	1.13	3.3
NYS	100.38	46.25	IBM (L)	46.25	-4.13	-8.2
OTC	19.50	5.50	Kendall Square Research	18.00	-0.63	-3.4
NYS	118.00	83.00	Matsushita Electronics	89.88	-3.13	-3.4
OTC	17.50	6.00	Pyramid Technology	13.75	4.00	41.0
OTC	22.00	11.13	Sequent Computer Sys.	21.25	0.38	1.8
OTC	17.25	1.38	Sequoia Systems Inc.	2.16	0.03	1.5
NYS	54.25	29.50	Stratus Computer Inc.	34.13	0.25	0.7
NYS	15.88	9.88	Tandem Computers Inc.	15.75	0.75	5.0
NYS	11.75	4.50	Unisys Corp.	10.63	0.38	3.7
ASE	7.50	0.06	Wang Labs Inc. (B)	0.38	0.00	0.0

SOFTWARE — Up 0.2%

Exch	52-Week Range			Jan. 08 3 PM	Wk Net Change	Wk Pct Change
OTC	65.75	25.25	Adobe Systems Inc.	33.13	1.63	5.2
OTC	44.25	10.25	Aldus Corp.	15.00	0.75	5.3
OTC	19.75	7.00	American Software Inc.	8.88	-0.13	-1.4
OTC	24.38	9.75	Ask Computer Systems	21.75	-1.63	-7.0
OTC	56.50	23.25	Autodesk Inc.	47.75	1.50	3.2
OTC	37.75	3.75	Bachman Info. Systems	5.38	0.25	4.9
OTC	43.00	34.00	BGS Systems Inc.	42.00	0.50	1.2
OTC	79.00	37.25	BMC Software Inc.	74.25	1.75	2.4
OTC	25.50	13.75	Boole & Babbage	23.25	1.25	5.7
OTC	83.00	19.75	Borland Int'l Inc.	20.75	-1.50	-6.7
OTC	10.50	3.63	CE Software	3.88	-0.13	-3.1
ASE	32.75	9.38	Cheyenne Software Inc.	30.75	0.63	2.1
OTC	17.75	8.25	ChipSoft (H)	17.25	1.00	6.2
OTC	12.50	5.63	Cognos Inc.	7.50	0.75	11.1
NYS	20.75	10.88	Computer Associates (H)	20.63	0.38	1.9
NYS	12.38	4.00	Computervision Corp.	5.50	-0.25	-4.3
OTC	20.00	6.75	Comshare Inc.	12.75	-0.50	-3.8
OTC	47.88	6.00	Easel Corp.	13.00	0.25	2.0
OTC	26.50	11.75	Frame Technology	15.50	0.25	1.6
OTC	25.00	12.50	Group I Software	14.00	-1.25	-8.2
OTC	6.63	3.50	Hogan Systems Inc.	6.38	0.75	13.3
OTC	25.50	13.75	IMRS (H)	24.50	-0.25	-1.0
OTC	36.25	18.50	Information Resources	30.88	-0.63	-2.0
OTC	37.75	8.81	Informix Corp. (H)	34.13	-2.13	-5.9
OTC	22.38	11.00	Intergraph Corp.	12.75	-0.50	-3.8
OTC	15.00	7.75	Interleaf Inc.	12.50	0.25	2.0
OTC	20.25	10.25	Intersolv Inc.	15.00	0.75	5.3
OTC	21.38	9.50	Knowledgeware Inc.	14.88	-0.13	-0.8
OTC	52.75	28.75	Legent Corp.	48.50	0.50	1.0
OTC	38.75	14.75	Lotus Development	19.00	-0.63	-3.2
OTC	23.25	13.00	McAfee Associates	15.25	-1.75	-10.3
OTC	7.38	1.88	Meca Software	6.00	0.50	9.1
OTC	22.25	5.25	Mentor Graphics	8.88	0.75	9.2
OTC	42.75	27.25	Micro Focus	42.25	0.25	0.6
OTC	20.50	6.50	Micrografx Inc.	11.00	0.63	6.0
OTC	95.00	65.50	Microsoft Corp.	86.63	1.25	1.5
OTC	29.75	12.00	Oracle Corp. (H)	29.63	1.25	4.4
OTC	56.25	25.25	Parametric Technology	49.00	-4.00	-7.5
OTC	32.00	22.50	Peoplesoft	32.00	3.75	13.3
OTC	11.00	3.50	Phoenix Technologies	6.25	0.50	8.7
OTC	24.50	11.25	Platinum Technology	19.25	-1.00	-4.9
OTC	61.50	29.00	Progress Software Corp.	58.75	1.13	2.0
OTC	26.63	3.63	Quarterdeck Office Sys.	4.00	-0.13	-3.0
OTC	32.75	11.75	Rainbow Technologies Inc.	17.50	-0.50	-2.8
OTC	22.75	4.00	Rasterops	7.13	-0.75	-9.5
OTC	17.25	3.63	Ross Systems	8.50	-0.63	-6.8
OTC	26.00	8.50	Sapiens USA Inc.	25.75	-0.25	-1.0
OTC	26.25	6.75	Software Publishing Corp.	9.00	0.25	2.9
OTC	8.38	2.00	Software Toolworks Inc.	7.50	0.00	0.0
OTC	7.25	0.75	Spinnaker Software	1.25	-0.19	-13.1
OTC	16.50	3.25	State of the Art	9.00	1.50	20.0
NYS	25.25	13.75	Sterling Software Inc.	19.88	-1.13	-5.4
OTC	30.00	8.00	Struct. Dynamics Research	12.25	1.25	11.4
OTC	49.75	21.00	Sybase Inc. (H)	45.63	-3.63	-7.4
OTC	51.00	5.88	Symantec Corp.	12.75	-0.88	-6.4
NYS	13.75	5.25	Systems Center Inc.	7.75	-0.25	-3.1
OTC	25.50	11.84	System Software Assoc. (H)	24.00	0.50	2.1
OTC	13.25	2.50	Trinzic Corp.	5.13	-0.75	-12.8
OTC	23.75	14.50	Walker Interactive Systems	20.75	-1.25	-5.7
OTC	5.38	1.38	Wordstar	2.69	-0.06	-2.3

SEMICONDUCTORS — Up 3.9%

Exch	52-Week Range			Jan. 08 3 PM	Wk Net Change	Wk Pct Change
NYS	21.50	7.38	Advanced Micro Devices	19.38	1.25	6.9
NYS	16.25	8.63	Analog Devices Inc. (H)	16.00	-0.25	-1.5
OTC	17.00	7.63	Atmel Corp.	16.38	0.00	0.0
OTC	14.13	3.25	Chips and Technologies	4.63	0.13	2.8
NYS	18.38	7.38	Cypress Semiconductor Corp	10.38	1.13	12.2
NYS	14.50	7.00	Dallas Semiconductor	14.38	1.00	7.5
OTC	98.25	46.50	Intel Corp. (H)	98.25	11.25	12.9
NYS	11.13	4.88	LSI Logic Corp.	10.75	0.00	0.0
NYS	22.38	12.88	Micron Technology	20.50	1.63	8.6
NYS	109.00	68.50	Motorola Inc. (H)	109.00	5.50	5.3
NYS	14.13	7.38	National Semiconductor	11.38	0.75	7.1
OTC	27.00	8.25	Sierra Semiconductor	12.00	-1.50	-11.1
OTC	37.00	22.25	SynOpsys	37.00	2.38	6.9
NYS	54.25	31.50	Texas Instruments	54.25	7.63	16.4
OTC	10.50	6.00	VLSI Technology	8.38	0.25	3.1
OTC	7.63	2.13	Weitek	5.88	-0.88	-13.0
ASE	9.13	3.00	Western Digital Corp. (H)	9.13	0.50	5.8
OTC	31.00	14.50	Xilinx	23.75	-1.50	-5.9
OTC	38.00	17.50	Zilog Inc. (H)	38.00	3.75	10.9

PERIPHERALS AND SUBSYSTEMS — Up 1.0%

Exch	52-Week Range			Jan. 08 3 PM	Wk Net Change	Wk Pct Change
OTC	29.75	16.75	Banctec Inc. (H)	27.75	-1.25	-4.3
OTC	23.50	9.25	Cambex Corp.	13.75	-2.25	-14.1
ASE	17.75	6.00	Cognitronics Corp. (H)	16.13	-1.25	-7.2
NYS	23.88	16.75	Conner Peripherals	21.63	0.88	4.2
OTC	22.75	10.75	Creative Technologies Inc.	18.25	-1.25	-6.4
OTC	27.50	14.25	Data Race Inc.	24.50	0.75	3.2
ASE	19.66	4.75	Dataram Corp.	11.13	1.63	17.1
NYS	24.25	7.25	EMC Corp. (H)	22.63	-1.13	-4.7
OTC	10.50	5.38	Emulex Corp. (H)	9.63	-0.25	-2.5
OTC	23.00	13.25	Evans & Sutherland	18.25	0.00	0.0
OTC	40.63	12.00	Exabyte	16.38	-1.88	-10.3
OTC	62.00	19.00	Intelligent Info. Systems (H)	62.00	11.25	22.2
OTC	11.25	4.75	Iomega Corp.	7.38	0.00	0.0
OTC	34.75	10.25	IPL Systems Inc.	12.00	0.25	2.1
OTC	23.25	10.75	Komag Inc.	17.25	-0.25	-1.4
OTC	19.63	6.63	Maxtor Corp.	13.75	-0.63	-4.3
OTC	12.63	7.13	Micropolis Corp.	9.50	0.63	7.0
NYS	107.00	85.50	3M Corp	99.38	-1.25	-1.2
OTC	6.75	4.00	Printronix Inc.	4.75	0.25	5.6
NYS	15.50	6.88	QMS Inc.	13.25	0.00	0.0
OTC	18.00	12.13	Quantum Corp.	16.13	0.88	5.7
OTC	12.75	3.75	Radius Inc.	5.25	0.88	20.0
NYS	14.75	7.50	Recognition Equipment	14.25	0.38	2.7
OTC	13.88	7.88	Rexon Inc.	8.25	-1.88	-18.5
OTC	22.38	10.75	Seagate Technology	20.38	0.75	3.8
NYS	78.00	18.38	Storage Technology	20.38	-0.38	-1.8
NYS	22.50	16.50	Tektronix Inc.	21.50	1.38	6.8
NYS	83.50	63.63	Xerox Corp.	83.50	4.25	5.4

SERVICES — Off 0.7%

Exch	52-Week Range			Jan. 08 3 PM	Wk Net Change	Wk Pct Change
OTC	23.50	12.16	American Mgmt. Systems	21.88	-0.38	-1.7
NYS	5.38	3.00	Anacomp Inc.	4.25	-0.13	-2.9
OTC	26.00	15.50	Analysts Int'l (H)	23.50	-1.75	-6.9
NYS	55.63	38.75	Auto Data Processing	51.75	-1.38	-2.6
NYS	17.25	7.81	Ceridian Corp.	15.00	-0.25	-1.6
NYS	29.22	12.50	Comdisco Inc.	14.00	-0.38	-2.6
OTC	13.50	6.75	Computer Horizons	9.75	-0.13	-1.3
NYS	84.88	57.00	Computer Sciences	75.63	-2.63	-3.4
NYS	10.13	7.13	Computer Task Group	8.25	-0.13	-1.5
NYS	40.50	22.00	CompUSA Inc.	33.13	4.63	16.2
OTC	19.25	6.00	Corporate Software	11.75	0.25	2.2
OTC	30.75	7.75	Egghead Discount Software	10.25	0.38	3.8
NYS	34.00	25.25	General Motors E (EDS)	31.13	-1.75	-5.3
OTC	14.75	9.25	Inacom Corp.	14.00	-0.50	-3.4
OTC	30.38	6.25	Intelligent Electronics	14.13	1.25	9.7
OTC	14.88	6.63	Merisel	10.88	0.75	7.4
OTC	15.75	5.75	Microage Inc.	8.38	0.38	4.7
OTC	40.00	21.66	Paychex	34.75	-0.50	-1.4
NYS	83.50	59.75	Policy Management Sys. (H)	78.00	-5.50	-6.6
NYS	25.56	16.81	Reynolds and Reynolds	25.00	0.63	2.6
OTC	32.00	22.00	SEI Corp.	30.75	-1.00	-3.1
OTC	24.38	16.88	Shared Medical Systems	20.75	-1.63	-7.3
OTC	14.38	5.75	SHL Systemhouse	7.00	-0.13	-1.8
OTC	29.25	16.25	Software Spectrum Inc.	23.25	0.50	2.2
OTC	31.25	18.75	Sungard Data Systems (H)	29.50	-0.25	-0.8
NYS	3.63	1.13	Ultimate Corp.	1.88	-0.25	-11.8

KEY: (H) = New annual high reached in period (L) = New annual low reached in period
Note: Archive was acquired by Conner Peripherals. Wellfleet Comm. completed a 2-for-1 stock split.
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In Brief

Cray expects loss

Cray Research, Inc. last week said it would post its first-ever loss, citing a federal customer's delay in accepting a supercomputer and a previously disclosed $40 million restructuring charge. Although a $32 million Cray Y-MP C90 had been delivered before year's end, it was not certified for use by the unidentified customer until Jan. 2. Cray does not count revenue until its systems are in use by customers, a spokesman said.

The $40 million charge covers expenses associated with the closure of a Wisconsin plant, which eliminated some 650 positions. For the nine months ended Sept. 30, the Eagan, Minn., company earned $11.7 million on revenue of $570.2 million.

SHORT TAKES **WordPerfect Corp.** has acquired a controlling interest in **Reference Software International**, a San Francisco developer of software development tools. . . . **IMSL, Inc.**, a Houston-based application tools vendor, and **Precision Visuals, Inc.**, a Boulder, Colo., provider of data analysis software, have merged. The name of the new firm is **Visual Numerics, Inc.** . . . **Fiserve, Inc.** in Milwaukee has agreed to acquire **Basis Information Technologies**, an information services subsidiary of **First Financial Management Corp.** in Atlanta, in a stock and cash deal valued at $96.5 million. . . . **Fore Systems, Inc.**, a Pittsburgh developer of Asynchronous Transfer Mode local-area network products, has received $5 million in equity financing from a group of investors led by **Patricof & Co. Ventures** in New York. . . . James McCormick, cofounder of **McCormick & Dodge**, has resurfaced as vice chairman of **U.S. LAN Systems Corp.**

IBM/McDonnell Douglas deal questioned

By Mark Halper
ST. LOUIS

While IBM's recent outsourcing megadeal with McDonnell Douglas Corp. marks a case of troubled spirits joining forces, industry observers are wondering about IBM's profit and revenue potential from what the two parties said is a $3 billion accord.

Both companies are shrinking behemoths jarred by the concussions of change shaking their respective industries.

McDonnell Douglas, the $18.4 billion aerospace giant, faces a host of uncertainties in commercial as well as military markets. It decided to unload its data processing operations in order to concentrate on its core business of building and developing aircraft and missiles.

IBM, meanwhile, is trying to reinvent itself as a holding company for 13 autonomous operating units, of which its Integrated Systems Solutions Corp. (ISSC) outsourcing subsidiary is one.

Staff faces cuts

McDonnell Douglas' decision to outsource comes amid personnel cutbacks that have reduced its work force by more than 20%, from 113,000 in September 1991 to 93,000 a year later. The ISSC deal will enable McDonnell Douglas to cut its payroll by another 1,450 information systems employees, who will be offered jobs by IBM or by its partners in the deal, including Digital Equipment Corp. and Unisys Corp.

The aerospace company has yet to release financial results for the year ending Dec. 31, but in its third quarter, it lost $15 million owing to a write-off for the failure of its C-17, a military transport that literally snapped under development pressure during stress testing last fall.

Moreover, business potential in its traditional endeavors is diminishing. The company derives some 60% of its revenue from military customers worldwide. The foreign scene seems healthy — the company closed the year with a large sale of F-15 fighter planes to Saudi Arabia — but domestic opportunities are questionable.

Given this iffy tableau, industry observers questioned the $3 billion figure attached to the IBM contract, although they said they do not doubt that the deal is, by some measure, large.

Chuck Phillips, vice president at Soundview Financial Corp. in Stamford, Conn., predicted the deal will reach that level "only if all the individual options are exercised."

Mum's the word

Neither McDonnell Douglas nor IBM would elaborate on the deal's various contingencies. But as IBM and other outsourcers have discovered in earlier contracts, a client's business can fluctuate during the course of a contract. ISSC had to restructure an outsourcing contract with Bank South Corp. last year, for instance.

Outsourcers are writing more flexible contracts to accommodate change these days, making estimated contractual value speculative, observers said.

Also unknown is how much margin IBM built into its price tag.

The lack of potential margin is believed to be what drove Electronic Data Systems Corp. away. After some two years of posturing for the job — which led to the November 1991 purchase of McDonnell Douglas Systems Integration Co. — EDS decided not to respond to the aerospace company's request for proposals.

Merrill Lynch analyst Steve McClellan said EDS was unwilling to spring for as much of an up-front investment as the deal required for equipment purchases. "EDS dropped out because it didn't want to pay more than $150 million," McClellan said. "Who knows how much IBM is paying."

While EDS' trademark strategy has been to invest money at the front end of a deal, it has been getting more selective with the clients it pursues, McClellan claimed. "EDS wants to make sure they're getting a return on their investment," he explained.

Phillips estimated that IBM will make less than the 8% to 12% margin he considers customary in an outsourcing deal. "But relative to what IBM is experiencing in other parts of its business, this is attractive to them," he said.

In control

The contract calls for ISSC to take over data and voice operations, maintenance and support. IBM is tapping DEC as a subcontractor to maintain the large stable of VAX equipment that now belongs to IBM. IBM essentially acquired McDonnell Douglas Aerospace Information Services (MDAIS), which had provided data processing and voice communications to most of McDonnell Douglas. ISSC will not provide service to McDonnell Douglas Helicopter Co., which did not use MDAIS. The operation will continue to provide its own data processing.

FileNet restructures after quarter loss

By Ellis Booker
COSTA MESA, CALIF.

After eight consecutive profitable quarters, document imaging pioneer FileNet Corp. disclosed last week that it would report a fourth-quarter pretax loss of roughly $7 million.

The company reacted swiftly to its first losing quarter in years, enacting a restructuring plan designed to accelerate a move away from manufacturing to open systems software and services. Officials meanwhile blamed the unexpected result on the sluggish U.S. economic recovery and last-minute purchasing delays by European customers.

"The U.S. fell below expectations as did Western Europe [in the quarter]," said Jordan M. Libit, vice president of marketing.

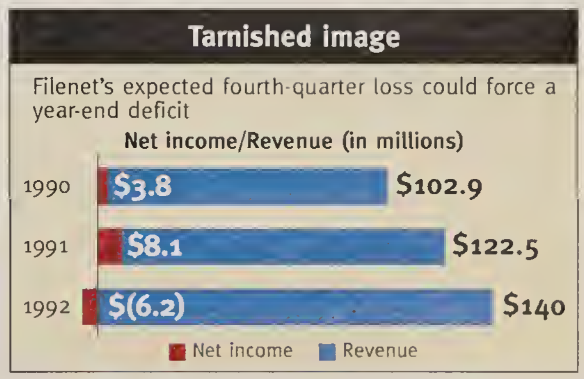
FileNet's board of directors approved a pretax restructuring charge of $6.8 million for the quarter, which will cause a net loss of approximately $6.2 million for the year, in order to accelerate plans to move away from manufacturing jukeboxes and image servers.

While FileNet continues to make a line of Unix servers and optical disc jukeboxes, in recent years it has deliberately sought to open its imaging system to other platforms. Last May, for example, FileNet began shipping its Series 6000 Unix servers, which use IBM's RISC System/6000 hardware platform. Unisys Corp. remarkets FileNet's imaging software, and FileNet is porting its software to Unix hardware from Ing. C. Olivetti & Co.

The restructuring is expected to increase revenue from open systems sales, said Pam Bliss, a senior industry analyst at the Document Imaging Service of Dataquest, Inc. in San Jose, Calif. Yet open systems sales account for only about 10% of the 100 or so systems FileNet shipped in 1992, Bliss estimated, adding that FileNet apparently wishes to avoid the fate of another imaging pioneer: Wang Laboratories, Inc. "Wang suffered the pain of not making the tough choices fast enough," she said.

The restructuring plan will include a 10% to 15% reduction in FileNet's 1,000-person worldwide work force but will not involve diluting the company's research and development budget, Libit said.

For the year ended Jan. 3, 1993, FileNet said it expects to post revenue of $140 million, a 14% increase over its 1991 revenue of $122.5 million. Net income in 1991 was $8.1 million.


Tarnished image

Filenet's expected fourth-quarter loss could force a year-end deficit

Trends Consultant usage

According to a recent survey, 46% of respondents employed external IS consultants for advice in the past two years. They didn't come cheap, either. The average fee: approximately $125 per hour.

Top 5 most common consultation projects

1. Re-engineering
2. Downsizing
3. Outsourcing
4. Open systems
5. Application Development

Biggest time consumers

	Hours worked	Median cost*
Application development	1,500	$225
Outsourcing	1,000	$150
Re-engineering	900	$147
Downsizing	750	$110

*In thousands

Bottom line: Consultation isn't cheap

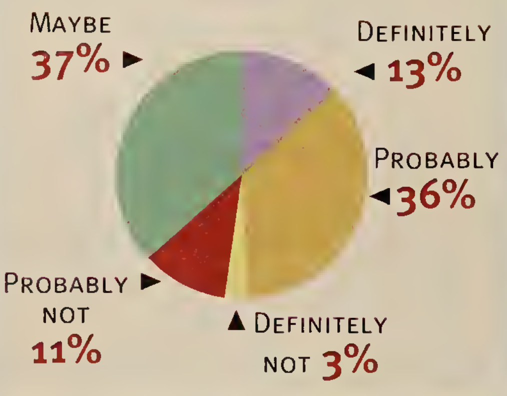
Median cost for all consultants: **$125** per hour — roughly **$900** per day.

Median number of consultant hours required for all projects: **300 hours**.

Median cost per project: **$50,000**.

'Big name' consultants tend to cost about **$25** to **$125** more per hour.

"Would you hire the same consultants again for similar assignments?"



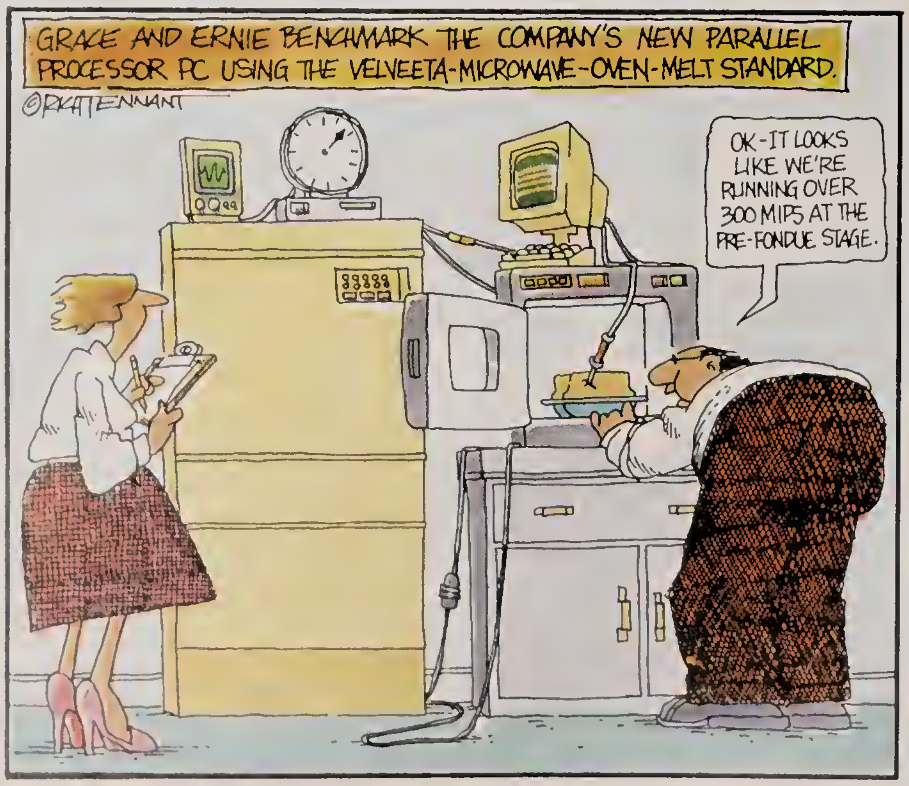
Hidden agendas

In **46%** of the cases, consultants' advice led to more work for themselves.

Base: 530 U.S. sites, 277 international sites

Source: Xephon/WPWS, Oviedo, Fla.

The Fifth Wave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OK-IT LOOKS LIKE WE'RE RUNNING OVER 300 MIPS AT THE PRE-FONDUE STAGE.

Inside Lines

Sad tidings

After signing a letter of intent for a 10-year outsourcing contract with Computer Sciences Corp., Qualex, Inc., a Durham, N.C.-based photo processing company, delivered CSC some bad news on New Year's Eve. After a month of due diligence, the company decided to negotiate instead with IBM's Integrated Systems Solutions Corp. (ISSC). Two different sources offered varying explanations for the last-minute shift: Either ISSC offered a better cash up-front deal or it simply offered a more cost-effective deal. CSC's bid was believed to be around $130 million, high for a company the size of Qualex, a roughly $700 million company that has about 80 people in its IS shop. Perhaps IBM was able to leverage its outsourcing presence at Eastman Kodak, which owns 49% of Qualex.

Flaring NOS

Although Novell spokesmen will say only that the company is "on target" for its planned first-quarter release of NetWare 4.0, analysts and users close to Novell are predicting a March 1 ship date. Beta testers who have tested the most recent beta-test release, such as Dan Kohner, network director at Houston's M.D. Anderson Cancer Research Center, say it has all the functionality Novell promised, including global directory service, data compression algorithms and protected-memory application space. Kohner says he considers the product "ready to go."

Switching gears

Cell-relay telecommunications vendor StrataCom and router giant Cisco Systems will team in New York this week on Asynchronous Transfer Mode (ATM) networking efforts. StrataCom reportedly will announce a new, "pure" ATM platform — separate from its IPX frame-relay switch — that will accept traffic from IPXs and other types of devices and convert it to ATM cells, initially at T3, then at Sonet speeds. Cisco's role will likely be the rollout of an ATM data service unit, which will segment frames into standard ATM cells and transport them to the StrataCom box.

OK, this time we really mean it

Lotus will unveil yet another strategy for bringing together its Notes groupware and CC:Mail E-mail packages at Networld '93 in Boston this week, according to an industry source. Expected to be added are shared administration tools and an option to choose CC:Mail as the mail package in Notes. Lotus also said it will unveil an upgraded CC:Mail for Windows, demonstrate its Notes 3.0 Microsoft Windows and Macintosh-based clients, demonstrate new work-flow technology in Notes 3.0 and announce a messaging service based on Notes and CC:Mail.

All charged up

The surging problem of electrical disturbances clobbering LANs may get some relief at this week's Networld '93 show in Boston. Best Power Technology will demonstrate its Logic Voltage Monitor, which sits on a LAN file server or workstation expansion slot and periodically monitors DC voltage levels. This in turn lets network managers determine which network errors are caused by electrical glitches, and they get early warning of power supply failure. Best's rival, Network Security Systems, says it will also show software that analyzes voltage trends on the LAN.

Not too long ago, California's highways were outfitted with a series of roadside cellular phones so stranded drivers could call for help. Each phone broadcasts a unique Electronic ID number (EIN) for billing purposes. One problem: EIN readers are available from a number of electronic suppliers, ostensibly for repair, programming and maintenance. You can guess what happened next. The EINs were illegally detected, and California found itself with an extra 11,000 calls — and one whopper of a phone bill. Phone, fax or CompuServe News Editor Alan Alper with news tips at (800) 343-6474, (508) 875-8931 or 76537,2413, respectively. Or try Computerworld*'s 24-hour voice-mail tip line at (508) 820-8555.*

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